

The Adaptation Gap Report. Towards Global Assessment.

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THE ADAPTATION GAP

TOWARDS
GLOBAL
ASSESSMENT

REPORT



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—
REPORT

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GLOSSARY

The entries in this glossary are adapted from definitions provided by authoritative sources, such as the Intergovernmental Panel on Climate Change (IPCC) and the Organisation for Economic Co-operation and Development (OECD).

Adaptation	In human systems, the process of adjustment to actual or expected climate and its effects in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate.
Adaptation costs	Costs of planning, preparing for, facilitating, and implementing adaptation measures, including transaction costs.
Adaptive capacity	The combination of the strengths, attributes and resources available to an individual, community, society, or organization that can be used to prepare for and undertake actions to reduce adverse impacts, moderate harm, or exploit beneficial opportunities.
Adaptation M&E system	A country-specific adaptation Monitoring and Evaluation (M&E) system refers to any mechanisms put in place at national level to monitor and/or evaluate adaptation-related efforts and their results with the aim of understanding adaptation progress over time.
Baseline	State against which change is measured. It might be a current baseline, in which case it represents observable, present-day conditions. It might also be a 'future baseline', which is a projected future set of conditions excluding the driving factor of interest. Alternative interpretations of the reference conditions can give rise to multiple baselines.
Climate	Climate in a narrow sense is usually defined as the 'average weather', or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system.
Climate Change	Any change in climate over time, whether due to natural variability or as a result of human activity.
Climate (change) impacts	The effects of climate change on natural and human systems.
Evaluation	Evaluation is the systematic and objective assessment of an on-going or completed project, programme or policy, its design, implementation and results.
Exposure	The presence of people, livelihoods, species or ecosystems, environmental functions, services, and resources, infrastructure, or economic, social, or cultural assets in places and settings that could be adversely affected.
Hazard	<p>The potential occurrence of a natural or human-induced physical event or trend or physical impact that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources.</p> <p>In this report, the term hazard usually refers to climate-related physical events or trends or their physical impacts.</p>

Indicators	Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor.
Metrics	A set of “metrics,” or indexes, can be defined as a system of measurement that includes the item being measured, the unit of measurement, and the value of the unit.
Mitigation	Here understood as an anthropogenic intervention to reduce the anthropogenic forcing of the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks.
Monitoring	Monitoring is an activity that uses systematic collection of data on specified indicators with the aim of tracking change.
Resilience	The capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, learning and transformation.
Vulnerability	Here understood as the propensity or predisposition to be adversely affected by climate impacts.

ACRONYMS

COP	Conference of the Parties
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and Evaluation
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
ND-GAIN	Notre-Dame Global Adaptation Index
PPCR	Climate Investment Fund's Pilot Program for Climate Resilience
SDGs	Sustainable Development Goals
TAMD	Tracking Adaptation and Measuring Development
UNFCCC	United Nations Framework Convention on Climate Change

FOREWORD

Storm after storm provides unmissable reminders of the links between mitigating and adapting to the impact of climate change and sustainable development. Those vital links are highlighted in a goal within the Paris Agreement, which aims to unify global efforts to make our societies more robust. To support that goal, this report offers guidance on a framework to assess progress, outlining criteria for national indicators that can be compared globally.

Almost every continent has recently suffered the severe consequences of extreme weather events first hand; events increasing in frequency and severity because of climate change. With each new disaster, it is clear there is a serious gap between what is required to protect our communities and what is actually in place. Yet, we do not even know how to accurately measure the size of that gap to prioritize planning and investment. In fact, there are currently no agreed-upon methods, indicators, metrics or frameworks in place. However, existing frameworks offer insight into opportunities to aggregate and synthesize national progress to provide a global picture.

To understand what is at stake, you need only look at the impact of recent hurricanes Maria and Irma. The effects will be felt for years to come, with thousands of people still displaced and millions of dollars needed to rebuild. For example, in Puerto Rico, approximately 86% of the island's 1.57 million electricity customers were still without power a month after being hit. As ever, the most vulnerable are the worst affected. People like Georgia Lopez Ortiz, an elderly resident in a crime-ridden neighbourhood in San Juan. For Georgia, the lack of electricity makes it impossible to cook and too dangerous to go outside after dark, while laundry can only be

hand-washed in a bucket. Her lifeline is, quite literally, a rope passed through the security bars of her patio to aid groups that deliver packages of water and dried food.

Unfortunately, Georgia's story will be repeated, again and again, until decision makers can take better informed and better coordinated precautions. That is why this report recommends looking at sustainable development, disaster risk reduction and climate change impacts jointly, to maximize synergies and minimize duplication of effort. Such a global framework would share and aggregate progress updates towards country-specific adaptation goals by building on existing communications to avoid creating undue burden.

I hope this report will help to guide that process. I also hope that our continued collaboration with the Netherlands, through the Global Centre of Excellence on Climate Adaptation, will rapidly bridge this crucial gap in understanding to protect people everywhere.



Erik Solheim

Head of UN Environment



EXECUTIVE SUMMARY

The Paris Agreement, adopted in 2015, established the global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal. The 2017 Adaptation Gap Report, which is the third global Adaptation Gap Report by UN Environment – prepared in collaboration with the Global Centre of Excellence on Climate Adaptation – focuses on one of the key questions arising in the wake of the global goal: **What are the ways forward to assess progress towards the global goal on adaptation?**

The report explores key opportunities and challenges associated with assessing progress on adaptation at the global level. The report synthesizes information relevant for the ongoing work under the United Nations Framework Convention on Climate Change (UNFCCC) to prepare for the implementation of the Paris Agreement. In contrast to previous Adaptation Gap Reports, the 2017 report focuses on issues relating to frameworks, comprising concepts, methodologies and data, rather than on assessing a particular dimension of the adaptation gap. Future Adaptation Gap Reports will return to assessments of specific adaptation gaps.

An international team of experts, assessing the latest literature and practical experience within the topic area, has prepared the report. The process has been

overseen by a steering committee, and all chapters have undergone extensive external review.

The Paris Agreement's global goal on adaptation provides a new starting point and impetus for assessing progress on adaptation at the global level, but additional information is required for assessing such progress.

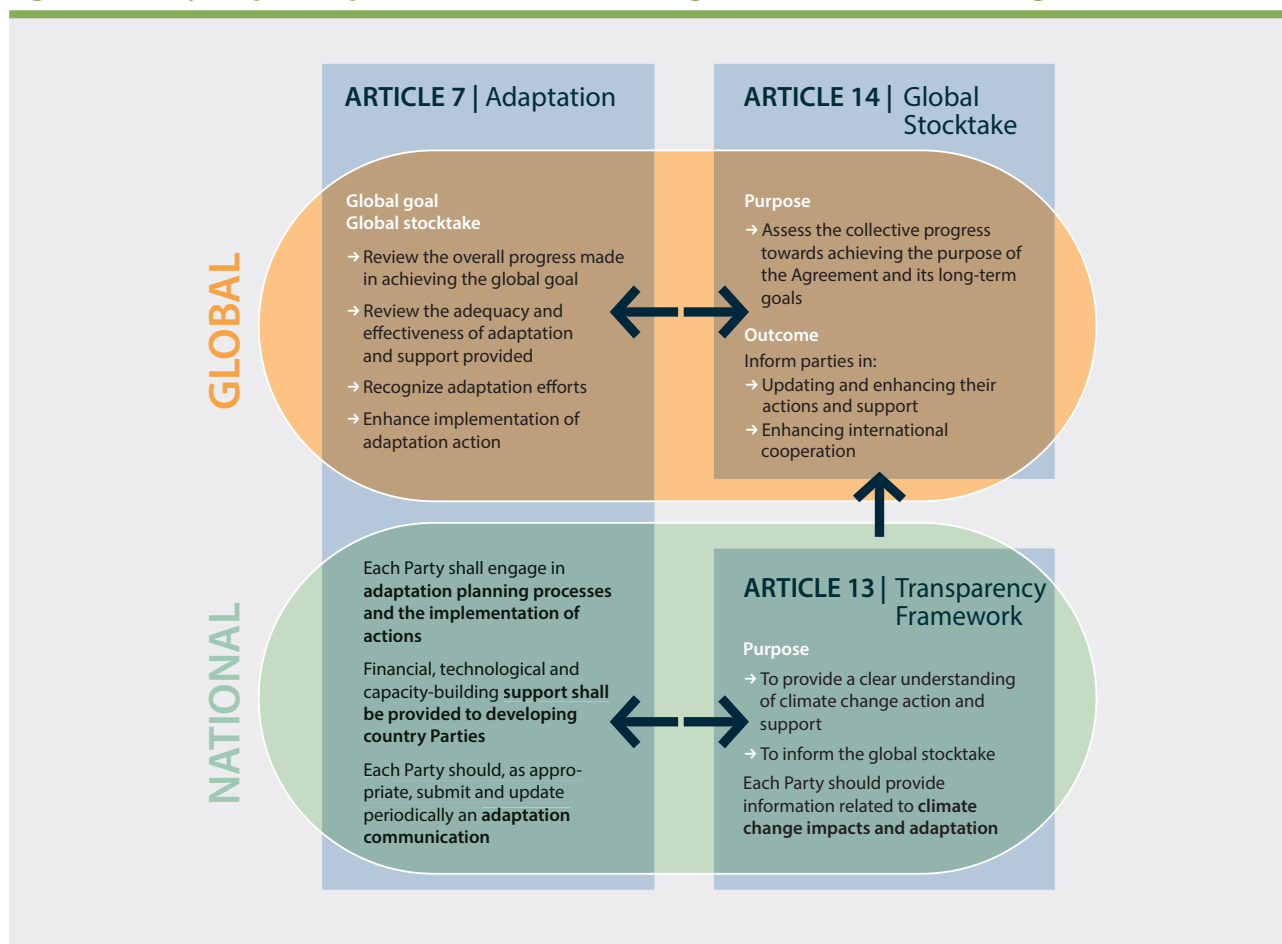
The global goal on adaptation provides a collective vision for the direction of global adaptation action. The goal is broad and multifaceted, and progress towards it will be reviewed in the context of the global stocktake specified in Article 14 of the Paris Agreement. The global stocktake will take place every five years starting in 2023, and include reviewing the overall progress in achieving the global goal on adaptation. In addition, the Paris Agreement contains two other provisions on adaptation that are important in the context of this report: the transparency framework and adaptation communications. These four provisions and the interlinkages between them are illustrated in Figure ES.1, further highlighting the global and national dimensions of the provisions.

An assessment of collective progress towards the global goal on adaptation implies that national adaptation reporting and national data are synthesized or aggregated in a transparent and systematic manner. A key question relates to the extent to which reporting should and can be comparable and standardized across countries. The existing communication



Photo: © Neil Palmer (CIAT)

Figure ES.1: Key adaptation provisions under the Paris Agreement and the interlinkages between them



vehicles, including the Nationally Determined Contributions (NDCs), the National Adaptation Plan (NAP) processes and the National Communications, offer valuable information on past and planned adaptation actions and support needs. However, additional information is needed to allow for a comprehensive and comparable assessment.

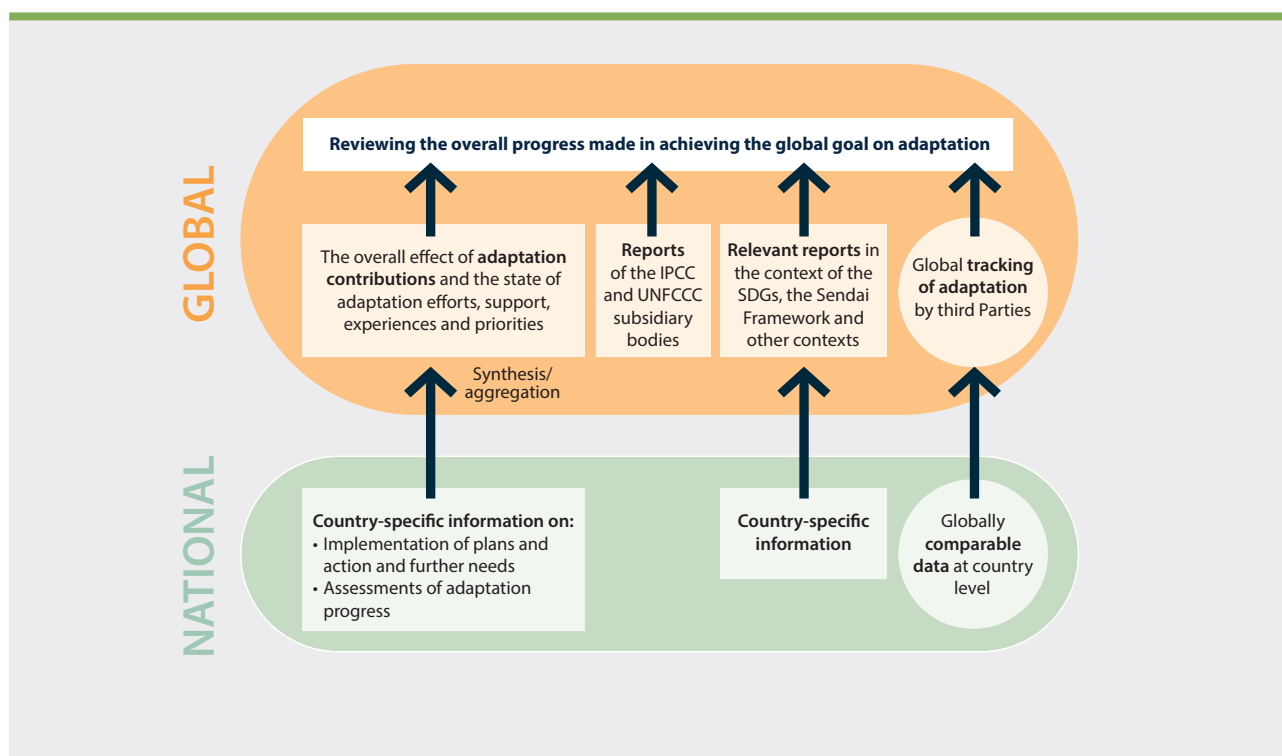
Globally comparable metrics that track progress towards the global goal on adaptation based on country-level information, while avoiding undue burden on countries, provide additional opportunities yet pose a considerable challenge.

Assessing global adaptation progress requires frameworks and metrics that are applicable across countries and sectors, and over time. The complexity of adaptation to climate change as a development and policy issue presents major challenges for a comprehensive assessment of adaptation progress globally, because it requires the development

and use of metrics that encompass enormous diversity. At the same time, metrics that can be aggregated and compared at higher levels do not lend themselves well to context specificity and meaningful progress on adaptation, particularly at national and sub-national levels. Decisions regarding which metrics to assess globally should take such trade-offs into account.

Opportunities to complement national adaptation communications with third-party information are currently explored. Such information can be derived from bodies such as the Intergovernmental Panel on Climate Change (IPCC), frameworks developed by independent research and non-government organizations, and dovetailing with other global frameworks, such as the Sustainable Development Goals (SDGs) and the Sendai Framework on Disaster Risk Reduction (Sendai Framework). Figure ES.2 outlines how various sources of information may feed into an assessment of the overall progress made in achieving the global goal on adaptation.

Figure ES.2: Reviewing the overall progress in achieving the global goal on adaptation based on multiple sources of information



Existing tools and frameworks for adaptation assessment, including for monitoring and evaluation (M&E), are generally geared towards project- to -country-level assessments and are typically not designed to be aggregated at global level.

Existing frameworks allow a distinction to be made between two generic approaches, focusing on either activities or results of adaptation policies and action:

- Assessing **activities** examines what countries are doing to address climate risk, and aims to measure inputs and processes related to adaptation. Metrics to assess levels and content of activities can capture whether actors are creating positive conditions and strong institutions or an effective and enabling environment for successful adaptation, but they do not allow for direct connections to be made to reduced vulnerability or enhanced resilience and adaptive capacity;
- Assessing **results** examines what has come out of the activities to enhance adaptation. In policy evaluation terms, this approach aims to measure the outputs, outcomes and impacts of adaptation activities. However, along the results chain from inputs to impacts, attribution of specific activities to adaptation outcomes becomes increasingly difficult, because external factors play ever greater roles. To assess results, it may therefore be more useful to focus on contribution, rather than attribution, and qualitative evidence to support quantitative indicators.

Similarly, it is possible to distinguish between two different types of metrics:

- Descriptive metrics** do not provide value statements or normative assumptions, and generally use indicators of activities or results that can be more readily quantified. Descriptive metrics typically lend themselves more easily to repeated collection over time, which is of significance in relation to assessing progress towards the global goal on adaptation through the global stocktake;
- Evaluative metrics** attempt to qualify adaptation activities and results to understand whether activities and results are adequate and effective. These questions cannot be answered directly through data collection and synthesis, because evaluative responses are influenced by individual and collective perceptions, values and expectations. Evaluative assessments of adaptation thus require the articulation of principles that will structure analysis and the recognition that the results of the assessment are not fully objective, but the outcome of a political and societal process.

Countries currently use both types of information and metrics in their national adaptation M&E systems. To assess progress towards the global goal on adaptation, it is necessary to ensure not only comparability of information across countries, but also to utilize metrics that can be collected repeatedly. Finally, there is a clear correlation between the depth of information an adaptation assessment can provide and the resources available.

National adaptation M&E systems can facilitate global knowledge sharing and transparency in addition to offering domestic benefits, such as better informed planning and decision-making.

More than 40 countries across all continents have implemented, or are in the process of developing, country-specific adaptation M&E systems. Reflecting the diversity in national circumstances, needs, policies and climate risks, existing M&E systems differ significantly in terms of purpose, scope, methodology, institutional arrangements and types of reporting. Most countries have taken several years to develop and implement their national adaptation M&E systems and have faced multiple challenges, including lack of capacity and limited availability of data. Some countries, in particular Least Developed Countries (LDCs), will likely require support to establish ongoing assessments of adaptation progress. Country experiences indicate that the development of a national adaptation M&E system should start by clarifying the purpose(s) of the system. Clarification of purpose is essential to inform the design of appropriate methodologies and metrics and to assess information and data needs. The same applies for assessing adaptation progress globally.

Current national M&E systems mainly focus on monitoring adaptation. Few countries have undertaken an evaluation of national adaptation progress.

Indicators are an essential part of most adaptation M&E systems. Existing national M&E systems tend to focus on monitoring adaptation through process and output

indicators. Some countries intentionally avoid standardized indicators to allow for context-specific flexibility.

While adaptation M&E systems differ across countries, they provide similar types of information, including advances in adaptation policies and governance, mainstreaming, implementation, and changes in vulnerabilities and risks over time. These data are highly relevant for country-level reporting to the UNFCCC.

There is limited evidence of the extent to which national M&E systems capture actions by non-state actors, including private sector, sub-national government and civil society. Such actions will be important to include in a review of adaptation progress, locally, nationally and globally.

There are currently no agreed-upon methods, indicators, metrics or frameworks designed for an assessment of progress towards the global goal on adaptation, yet existing frameworks can provide insights into opportunities for aggregating and synthesizing country-level progress.

A review of existing frameworks for adaptation indicates the following key desirable criteria for an adaptation assessment framework at global level: capacity to aggregate or synthesize country-level data, transparency, consideration of progress over time, avoiding undue burden on countries, inclusion of proxy indicators that are coherent with a collective understanding of meaningful adaptation, and sensitivity to national vulnerabilities, resources, and contexts. These are described in more detail in Table ES.1.

Table ES.1: An overview of desirable criteria for a global framework for assessing progress on adaptation

Criteria	Description	Associated articles in the Paris Agreement
1. Aggregable	Does the measure reflect a consistent definition of adaptation that is comparable at the national level, and is available for a comprehensive number of countries globally, such that data could be systematically aggregated (qualitatively or quantitatively)?	Article 14 focus on collective progress and Article 7 inclusion of overall progress. To some extent Article 7's consideration of adaptation recognition
2. Transparent	Are definitions, assumptions, and methods transparent and consistent between countries?	Article 13 requirement for a transparency framework to inform the global stocktake
3. Longitudinal	Can the measure be tracked over time to monitor and evaluate progress?	Article 7 and 14's focus on progress implies tracking over time
4. Feasible	For global synthesis/aggregation of national assessments submitted to UNFCCC: Does the measure avoid placing undue additional reporting burden on countries? For global tracking of adaptation using publically available data: Is the measure reasonably available or can it be collected for all countries?	Implicit
5. Coherent	Does the measure reflect a concept or construct that is coherent with a general understanding of what constitutes meaningful adaptation? Are assumptions underpinning the use of proxies empirically validated or theoretically sound?	Implicit in the Paris Agreement, particularly Articles 7, 13, and 14
6. Sensitive to national context	Is the measure sensitive to diverse national contexts (for example, different political, economic, and socio-cultural priorities and resources)? Does the measure avoid unjustified, poorly evidenced or generalized assumptions — implicit or explicit — regarding what is 'good,' 'appropriate,' or 'sufficient' adaptation?	Implicit but unspecified; degree of desired normativity unresolved



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Four existing frameworks include mechanisms for reporting of country-level data that to some extent is aggregable or consistent across countries, although the frameworks use different approaches to address the trade-offs in assessing adaptation. However, a comparison of these frameworks for two countries, Mozambique and Cambodia, where 3 of the 4 frameworks have been implemented, shows that results are highly inconsistent across frameworks, even for a single country, and there is evidence that results are inconsistently reported across countries.

A framework for assessing global adaptation progress would benefit from being sufficiently: a) broad to absorb the range of information; b) rigorous to capture essential metrics of change; and c) flexible to accommodate innovations in assessment approaches.

Guidelines for scoring criteria, peer review and broad stakeholder engagement can all improve the validity and ownership of assessment frameworks.

In summary, the 2017 Adaptation Gap Report points to the following key insights for informing an assessment of global progress on adaptation:

1. **Frameworks that are based on nationally determined proximity-to-target approaches have the greatest potential to respect a diversity of national contexts while facilitating global assessment of progress.** There are no one-size-fits-all metrics given the diversity of resources, vulnerabilities, and adaptive capacity.

2. **A transparent assessment of global progress is facilitated if national reporting of descriptive metrics (including activities and results) is clearly distinguished from evaluative metrics.** Evaluative metrics reported by nations are poorly suited to quantification of progress at the global level. While countries may choose to include evaluative metrics in national reporting, such metrics are best suited to qualitative synthesis when assessing global progress. Despite this, some evaluative metrics should probably be standardized to facilitate widespread adoption, including special consideration of the most vulnerable countries and vulnerable groups within countries, and principles such as equality and equity between genders and across other dimensions of vulnerability.
3. **Global review of adequacy and effectiveness, which typically involves the use of evaluative metrics, is unlikely to be achievable through standardized or quantifiable indicators alone.** Countries may assess how well they are achieving their targets based on their climate risk profile and other considerations. To increase transparency for global synthesis of progress, these assessments are well suited to qualitative reporting formats and peer or expert review rather than standardized indicator scoring. A review of frameworks from outside of the adaptation field highlights the role of peer review mechanisms in increasing reliability, validity, and consistency of adaptation reporting.
4. **A focus on the contribution made to a result rather than strict attribution** is emerging as a more useful concept to link national efforts with results. Attributing outcomes and impact to inputs and action directly is

unlikely to be reliable or comparable at the national level or consistent across countries. Instead, narratives can be used to assess contribution and qualitative evidence to support quantitative indicators.

5. **Longitudinal assessment of adaptation** progress over time is reflected relatively poorly in existing assessment frameworks, but will be critical in a global effort to review adaptation progress over time. This implies the use of indicators of change or progress in addition to static measures of effort.
6. **The SDGs and the Sendai Framework** offer considerable opportunities for alignment via shared indicators, joint implementation, capacity building, and creation of policy support.
7. **Third party information** can complement information provided by countries. The IPCC, other international bodies, and the broader research community can be called upon to provide information, and to help further develop methodologies suitable for global assessment of adaptation progress.

The Paris Agreement provides a new impetus for a global perspective on adaptation, which offers immense opportunities for advancing our understanding of adaptation and our ability to assess adaptation action and results across geographical locations and administrative scales, and over time. If efforts are combined and sufficient, it is possible not only to improve our ability to assess progress on adaptation, but to enhance such progress, and to ensure an adequate adaptation response in the context of the temperature goal of the Paris Agreement.



01



CHAPTER 1

SCOPING THE ADAPTATION GAP REPORT 2017

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1.1 MOVING TOWARDS IMPLEMENTATION OF THE PARIS AGREEMENT AND ITS GLOBAL GOAL ON ADAPTATION

The adoption of the Paris Agreement at the twenty-first session of the Conference of the Parties (COP 21) to the United Nations Framework Convention on Climate Change (UNFCCC) in 2015 marked a milestone in international efforts to establish a universal foundation for ambitious action to combat climate change and address climate risks. For the first time, the Paris Agreement established a global goal on adaptation of “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal” (UNFCCC, 2016: Article 7.1). The goal provides a collective vision for the direction of global adaptation action, and underscores the interlinkages between adaptation, mitigation, and sustainable development, as illustrated in Figure 1.1.

The global goal on adaptation is broad and multifaceted, reflecting the inherent nature of climate change adaptation, resilience, and vulnerability, and acknowledging the immense differences in national circumstances, preferences,

and capacities across countries. However, because the goal is broad and multifaceted, it does not offer an immediate way of assessing whether progress towards it is being made, which is an important element of the global stocktake specified in Article 14 of the Paris Agreement. The global stocktake will take place every five years starting in 2023 and include reviewing the overall progress in achieving the global goal on adaptation (UNFCCC, 2016: Article 14).

A review of the overall progress in achieving the global goal on adaptation implies that national adaptation reporting and national data are synthesized or aggregated in a transparent and systematic manner. A key question is the extent to which reporting should and can be made comparable and standardized across countries. The various provisions of the Paris Agreement, including those relating to reporting on and reviewing progress made on adaptation, are currently further discussed as part of the Paris Agreement work programme, which is scheduled to be concluded by COP 24 in December 2018 (UNFCCC, 2017a).



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Figure 1.1: The global goal on adaptation in the context of mitigation and sustainable development



1.2 THE ADAPTATION GAP REPORTS AND THE FOCUS OF THE 2017 REPORT

The 2017 Adaptation Gap Report, prepared by UN Environment in collaboration with the Global Centre of Excellence on Climate Adaptation, focuses on one of the key questions arising in the wake of the global goal: What are the ways forward to assess progress towards the global goal on adaptation?

Answering this question predominantly involves conceptual, methodological and data issues, and therefore the focus of the 2017 report is on assessing some of the key opportunities and challenges associated with establishing frameworks – consisting of concepts, methodologies and data – that are suitable for assessing progress on adaptation at the global

level. Currently, there is a lack of such frameworks as well as limited understanding of what they require, which is highlighted as one of the main challenges for global level assessments in the published literature on the topic (Magnan and Ribera, 2016; Ford *et al.*, 2015) as well as under the UNFCCC (2017b).

The 2017 report is the third global Adaptation Gap Report prepared by UN Environment, and it follows up on some of the crosscutting areas for future analysis pointed out in the first Adaptation Gap Report, published in 2014 (UNEP, 2014). These include: transparency and comparability of methodologies; establishing appropriate metrics for

assessing adaptation needs and gaps; and monitoring and evaluation of adaptation. The focus of the 2017 Adaptation Gap Report implies that in contrast to previous reports, which provided preliminary assessments of adaptation gaps in finance, technology, and knowledge respectively, the 2017 report does not assess a specific adaptation gap. Future Adaptation Gap Reports will return to assessments of specific adaptation gaps, generically defined as the difference between the actual level of adaptation action and the level required to achieve a societal goal at a given point in time, influenced by risk preferences, resource limitations and competing priorities (UNEP, 2014). Furthermore, the focus on frameworks for assessing adaptation progress at the global level implies that the 2017 report includes very limited information on adaptation at sub-national scale.

The 2014 Adaptation Gap Report highlighted the relevance of a global framework for and approach to adaptation, which has now been established by the Paris Agreement. It concluded that although adaptation is often understood as a response to specific climate risks at a given time and in a given context, the magnitude and unequal distribution of the adaptation challenge, combined with the similarities of climate risks and adaptation responses across communities, sectors, and countries, indicate the importance of also considering adaptation in a global context. The 2014 report furthermore highlighted the Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction, which, at the time, were still under development, as inspirational examples of global frameworks where goals and targets are set, while accommodating differences in capacity, needs, and

Box 1.1: The Sustainable Development Goals and the Sendai Framework for Disaster Risk Reduction

The **Sustainable Development Goals** adopted in 2015 as part of the 2030 Agenda for Sustainable Development provide a vision for sustainable development and eradication of poverty by 2030. The 17 goals have a total of 169 associated targets and 230 approved indicators to assess progress made towards the goals at global level. Countries can define additional country-specific indicators. Progress made towards achieving the SDGs is assessed during the annual High Level Political Forum on Sustainable Development, which considers an annual global progress report prepared by the Secretary-General and national voluntary reviews of progress made at national and subnational levels, and undertakes annual thematic reviews.¹

The **Sendai Framework for Disaster Risk Reduction** adopted in 2015 strengthens a paradigm shift from managing disasters to managing current and future risks, bringing in resilience-building as the core target to be reached by 2030. To this end, countries pursue four priorities of action: understanding disaster risk; strengthening disaster risk governance; investing in resilience; and enhancing and leveraging disaster preparedness. It includes seven targets against which progress can be measured and 38 global indicators approved in February 2017. Progress in implementing the Sendai Framework is assessed biennially by UNISDR; analysis and trends will be presented in the Sendai Framework Progress Report, the first one being expected in 2019. As from January 2018, countries will be able to report against the indicators for measuring the global targets of the Sendai Framework, and disaster risk reduction-related indicators of the SDGs, using the online Sendai Framework Monitor. For most targets, progress will be evaluated by comparing data recorded for the decade 2020–2030 with the period 2005–2015.²

The Sendai indicators were designed to ensure coherence with the measurement of progress towards relevant targets of the SDGs. Indeed, Sendai indicators have been adopted for use in measuring disaster-related goals and targets of SDG 1 (ending poverty), 11 (making cities and settlements resilient) and 13 (global climate change action) thus allowing for simultaneous and coherent monitoring and reporting on the Sendai Framework and the SDGs (Leiter and Olivier, 2017).

1 Available at <https://sustainabledevelopment.un.org>.

2 Available at <http://www.preventionweb.net/drr-framework/sendai-framework>.

preferences (see Box 1.1). As subsequent chapters will show, these two frameworks may provide useful information to support the reviews of the overall progress in achieving the global goal on adaptation under the UNFCCC.

This report primarily considers issues related to the development of frameworks for global assessment of adaptation progress that are relevant in the context of reviewing the overall progress in achieving the global goal on adaptation as part of the global stocktake under the Paris Agreement. However, it is part of the much broader issue of how we can advance our understanding of adaptation and our ability to assess and compare adaptation action and results across geographical locations

and political scales, and over time. Addressing this issue will help us answer questions increasingly raised by different stakeholders inside and outside the UNFCCC, including national and sub-national decision makers, funders, researchers, the private sector and civil society. Questions such as: where are the gaps in adaptation? How is adaptation changing over time? Are projected risks being addressed? How can adaptation funds be most effectively invested? What factors explain adaptation progress and do they vary across region, country, sector? Which countries are leaders in adaptation and what lessons do they hold for promoting adaptation globally? How can the policy process be changed to induce adaptation that is more effective? (Ford and Berrang-Ford, 2016).

1.3 STRUCTURE OF THE REPORT

Following this introductory chapter, the report consists of five additional chapters, structured as follows:

Chapter 2 provides a summary of the adaptation provisions of the Paris Agreement and their current implementation, looks closer at the global goal on adaptation, and gives an overview of the adaptation information currently reported, highlighting considerations for an assessment of progress on adaptation.

Chapter 3 assesses key conceptual and methodological issues associated with global level assessment of adaptation, based on the current state of knowledge on assessing adaptation activities and results.

Chapter 4 draws on the experience from national monitoring and evaluation (M&E) systems that many countries have already established, or are in the process of developing, and looks into the opportunities for aligning national level adaptation M&E systems with global

frameworks, and for utilising the information these systems make available.

Chapter 5 assesses existing adaptation and non-adaptation assessment frameworks to identify the extent to which they can meet and inform the needs of a global stocktake. The chapter also outlines potential components of a global assessment framework that can fulfil the criteria identified in the Paris Agreement.

Chapter 6 synthesizes the key messages of the report chapters and outlines potential elements of a future framework for assessing adaptation progress at global level.

As for previous reports, an international team of experts, assessing the latest literature and practical experience within the topic area, has prepared this report. The process has been overseen by a steering committee, and all chapters have undergone extensive external review.





CHAPTER 2

ADAPTATION IN THE PARIS AGREEMENT AND PROVISIONS FOR REVIEW AND REPORTING

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2.1 INTRODUCTION

The adaptation provisions of the Paris Agreement put in place a process to review the overall progress made in achieving the global goal on adaptation as part of a periodic global stocktake to assess how much adaptation has been undertaken collectively and how much more is needed to manage the realized and projected climate change impacts. To allow for such an assessment, each country needs to interpret the global goal on adaptation in line with their own national circumstances and risk perceptions and undertake adaptation actions accordingly. The agreement calls for necessary support to be provided to developing countries. In addition, information on national adaptation action, which

could also be used for domestic purposes, is to be communicated and assessed to get insights on global progress.

This chapter provides an overview of the adaptation provisions of the Paris Agreement and the ongoing work to prepare for its implementation. It outlines the types of adaptation information currently reported to the UNFCCC and highlights agreed principles that should guide the assessment of progress on adaptation. Finally, it seeks to unpack the global goal on adaptation and illustrate how various sources of information could be used in the review of collective progress made.

2.2 PROVISIONS OF THE PARIS AGREEMENT RELEVANT TO THE GLOBAL GOAL ON ADAPTATION

The Paris Agreement features several provisions that are relevant to the global goal on adaptation and the review of progress made (see Figure 2.1).

First, Article 7 of the Agreement spells out how to achieve the global goal on adaptation, by specifying that:

- Each country shall engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or contributions (UNFCCC, 2016a: Article 7.9);

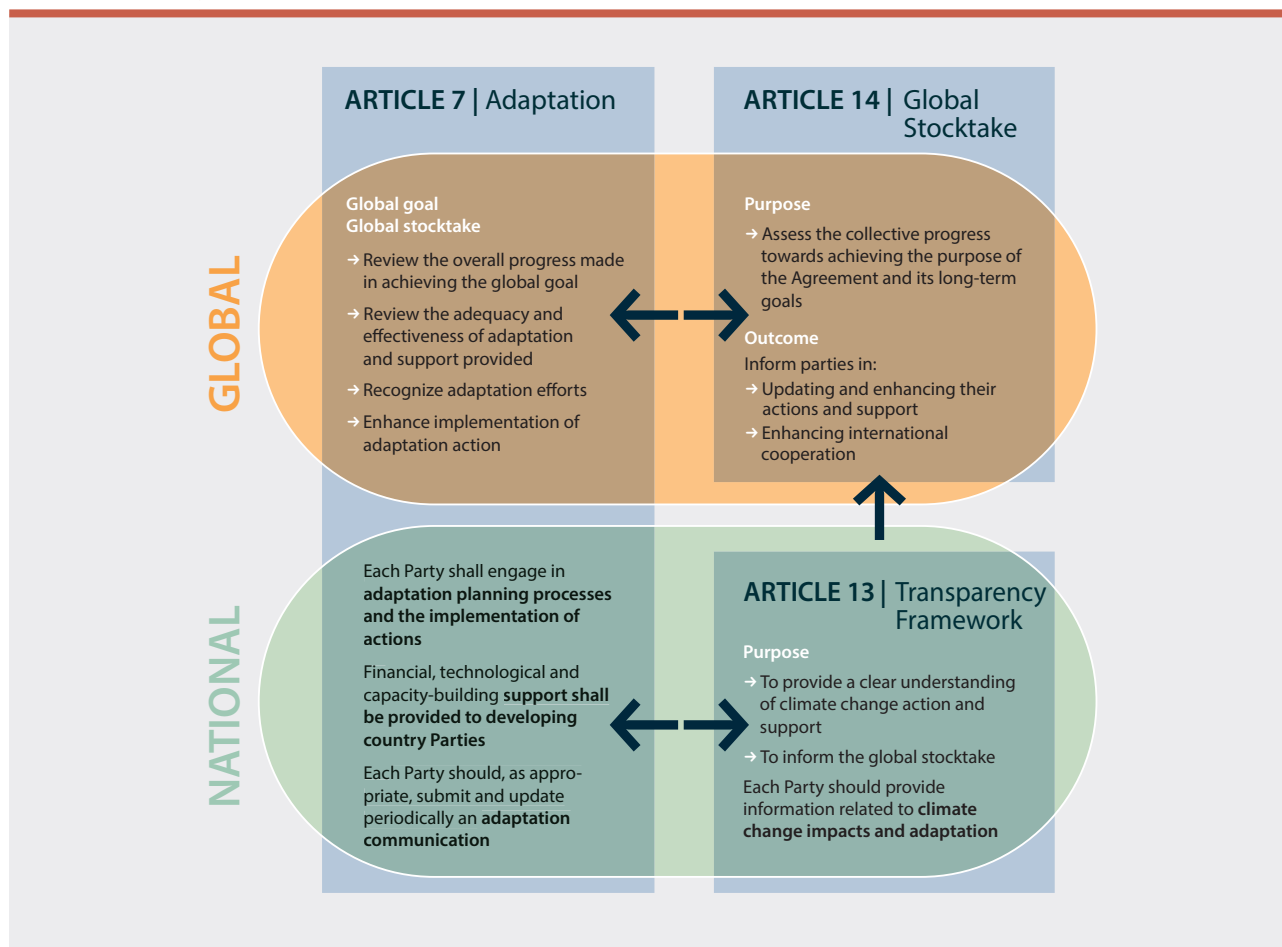
- Countries should strengthen their cooperation on enhancing action on adaptation (*ibid.*: Article 7.7);
- Continuous and enhanced international support, comprising finance, technology and capacity-building, shall be provided to developing countries (*ibid.*: Article 7.13).

Second, to promote effective implementation and build mutual trust and confidence, the Paris Agreement established a transparency framework, which is to be implemented in a facilitative, non-intrusive, non-punitive



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Figure 2.1: Provisions relevant to assessing progress made on adaptation under the Paris Agreement and their interlinkages



manner, respectful of national sovereignty, and without placing an undue burden on countries. The purpose of the transparency framework is to provide a clear understanding of climate change action in light of the objective of the UNFCCC as set out in its Article 2, and for adaptation action specifically, “Parties’ adaptation actions under Article 7, including good practices, priorities, needs and gaps, to inform the global stocktake under Article 14” (UNFCCC, 2016a: Article. 13.5). The purpose of the framework for transparency of support [for adaptation] is to give clarity on support provided and received by relevant individual Parties in the context of climate change actions under Article 7 (UNFCCC, 2016a: Article 13.6).

Third, to enable such understanding and clarity, Articles 7 (on adaptation) and 13 (on transparency) of the Agreement require countries to communicate relevant information. Article 7.10 states that each country should, as appropriate, submit and update periodically an adaptation communication that may describe its priorities, plans and actions, and implementation and support needs, without creating any additional burden for developing country Parties. The communications can be submitted as a component of, or in conjunction with, other communications or documents, including a National Adaptation Plan (NAP), a

Nationally Determined Contribution (NDC), and/or a national communication (Article 7.11). In addition, Article 13 states that each Party should also provide information related to climate change impacts and adaptation under Article 7, as appropriate (Article 13.8); developed country Parties shall, and other Parties that provide support should, provide information on financial, technology transfer and capacity-building support provided to developing country Parties (Article 13.9); and developing country Parties should provide information on financial, technology transfer and capacity-building support needed and received (Article 13.10) (UNFCCC, 2016a).

Finally, collective progress towards achieving the purpose and goals of the Agreement is assessed every five years through a comprehensive and facilitative global stocktake with a view to enhancing, in a nationally determined manner, Parties’ actions and support and international cooperation (Article 14). In addition to reviewing the overall progress made in achieving the global goal on adaptation, the stocktake will also recognize adaptation efforts of developing country Parties, review the adequacy and effectiveness of adaptation and support provided for adaptation, and enhance the implementation of adaptation action taking into account the adaptation communications (Article 7.14).

2.3 MOVING TOWARDS IMPLEMENTATION OF THE PROVISIONS RELATED TO REVIEW OF ADAPTATION PROGRESS AND REPORTING

The various provisions of the Paris Agreement, including those relating to reporting on and reviewing progress made on adaptation, are currently being made operational as part of the Paris Agreement work programme, which is scheduled to be concluded by COP24 in December 2018. Work is being undertaken by subsidiary and constituted bodies under the UNFCCC.

Regarding reporting on adaptation, Parties are considering the following under the Ad Hoc Working Group on the Paris Agreement:

- Modalities, procedures and guidelines for the transparency framework including consideration of reporting information on adaptation action and planning, with a view to collectively exchanging information and sharing lessons learned, and of support provided and received, including the use, impact, and estimated results thereof;
- Further guidance in relation to adaptation communications.

With respect to reviewing progress made on adaptation, including the global goal on adaptation, Parties are considering sources of input and modalities for the global stocktake under the Ad Hoc Working Group on the Paris Agreement. So far, the following adaptation-relevant inputs are foreseen in line with decision 1/CP.21, paragraph 99 (UNFCCC, 2016a):

- Information on the overall effect of the (adaptation components of) nationally determined contributions communicated by Parties;
- Information on the state of adaptation efforts, support, experiences and priorities from the adaptation communications, and reports prepared under the transparency framework;
- The latest reports of the Intergovernmental Panel on Climate Change (IPCC);
- Reports of the subsidiary bodies.

In addition, some countries are calling for inputs from non-state actors and for authoritative third-Party analysis to inform Parties. In terms of modalities, countries are

discussing reviewing progress in phases. These include a first technical phase, during which information would be gathered, compiled, and assessed; and a subsequent political phase, during which the outputs of the technical phase would be considered and political momentum be generated to mobilize ambition and international cooperation (UNFCCC, 2017a).

In support of the adaptation provisions of the global stocktake, the Adaptation Committee and the Least Developed Countries Expert Group under the UNFCCC were requested to develop:

- Modalities for recognizing adaptation efforts of developing country Parties;
- Methodologies for reviewing the adequacy and effectiveness of adaptation and support.

The Adaptation Committee and the Least Developed Countries Expert Group developed the modalities for recognizing adaptation efforts. However, they were unable to develop methodologies for reviewing the adequacy and effectiveness of adaptation and support provided, which would support the review of overall progress on adaptation (UNFCCC, 2017b). In their report to the COP, the Adaptation Committee and the Least Developed Countries Expert Group noted the constraints they encountered in developing methodologies, including in the context of the different circumstances of adaptation, and difficulties in setting adaptation baselines and targets, and the lack of common metrics to measure progress on adaptation. The Adaptation Committee and the Least Developed Countries Expert Group further noted that the current state of knowledge is not sufficient for addressing the mandate and requires more time and efforts (UNFCCC, 2017b).

No technical work has been mandated to be undertaken by any subsidiary and constituted body in support of reviewing the overall progress made in achieving the global goal on adaptation. Therefore, the details of the global goal on adaptation and how to measure progress against it remain an open question. Likewise, no technical work is being undertaken in the context of the global stocktake regarding enhancing the implementation of adaptation action. Hence, such an enhancement would be more an outcome rather than a part of the global stocktake.



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2.4 PROVISION OF INFORMATION UNDER THE UNFCCC AND THE PARIS AGREEMENT RELEVANT TO THE GLOBAL GOAL ON ADAPTATION

While adaptation communications and reporting under the transparency framework are envisaged as discussed in the previous section, there are currently three distinct vehicles through which adaptation information is provided:

1. **Nationally determined contributions.** In line with Article 3 of the Paris Agreement, countries are to undertake and communicate ambitious efforts as a NDC to the global response to climate change. As at 1 October 2017, 160 NDCs had been submitted, of which 108 contain adaptation-related information.³
2. **National adaptation plans.** Established in 2011, the process to formulate and implement NAPs seeks to enable least developed countries and other developing countries to address medium- and long-term adaptation needs. While many are still in the preparatory stages of the process, seven developing countries have communicated their NAPs through NAP Central.⁴
3. **National communications** are submitted by all countries; however, content and frequency of submission differ between developed and developing countries.

³ Available at <http://www4.unfccc.int/ndcregistry/Pages/Home.aspx>.

⁴ Available at <http://www4.unfccc.int/nap/Pages/national-adaptation-plans.aspx>.

While some form of comparable information is already provided by countries on their adaptation actions and support needs through their NDCs, NAPs or national communications, it does not lend itself to aggregation (UNFCCC, 2017c). Information communicated through the above channels is periodically compiled and synthesized to provide a global overview: a synthesis report on the aggregate effect of the NDCs (see UNFCCC, 2016b), an annual progress report on NAPs (see UNFCCC, 2017d) and a compilation and synthesis report of developing countries' national communications (see UNFCCC, 2005).

The NDCs show that countries are increasingly translating the global goal on adaptation into different national adaptation goals and associated targets, policies, mainstreaming efforts, and investments to reduce vulnerability and strengthen resilience. A majority of the adaptation components of the NDCs include qualitative adaptation targets, and about 40 countries introduced diverse quantitative targets.⁵ These targets illustrate the diversity of sectors covered, as well as the challenges of synthesizing or aggregating adaptation progress from national to global level.

As of 1 October 2017, seven developing countries have submitted their NAP documents to the UNFCCC secretariat.⁶ There is no standard structure and format for the NAP document. The NAP Technical Guidelines allow for a flexible approach depending on the needs of the country, though "Reporting, monitoring and review" is foreseen as one of the four elements of the NAP process (Least Developed Countries Expert Group, 2012). The existing NAPs contain some references to adaptation actions already undertaken, including examples of ongoing projects on specific sectors, and descriptions of institutions and other arrangements that have been put in place to implement adaptation. While some provide detailed lists of proposed goals, outputs, outcomes, and indicators to measure progress over time, for example Brazil and Kenya, others provide a more general indication of their plans to undertake Monitoring and Evaluation (M&E), for example Sri Lanka and Sudan.⁷

In terms of adaptation-related information contained in national communications, developed countries are to provide information on, inter alia, expected impacts and vulnerability, adaptation actions taken, and adaptation support (UNFCCC, 2000). Developing countries are to provide

information on, inter alia, national circumstances, expected impacts and vulnerability, policy frameworks, programmes containing adaptation measures, barriers, support received and an evaluation of adaptation strategies and measures (UNFCCC, 2003).

Overall, countries may wish to consider what information they are currently providing and what additional information might be required to fulfil the provisions of the Paris Agreement, as well as how such information might be synthesized or aggregated to review progress made at the collective level, that is, towards achieving the global goal on adaptation.

As countries continue to negotiate the details of the adaptation communications and reports prepared under the transparency framework, the following should be considered:

- **Accounting for differences and flexibility while ensuring some degree of comparability.** As seen in the NDCs, NAPs and national communications, targets, priorities, and needs regarding adaptation vary among countries, given that adaptation is context-specific and changing over time, and the reporting and assessment of progress inevitably needs to take such diversity into account. At the same time, a review of collective progress based on information provided by countries will only be possible if information is to a certain degree comparable. Thus, there is a trade-off between the ease of reviewing collective progress towards the global adaptation goal, and the degree of context-specificity in countries' adaptation reporting, which needs to be addressed while avoiding an undue reporting burden.
- **Avoiding placing undue (reporting) burden on countries.** Another challenge to reporting on progress made is to address the risk of placing an undue burden on countries, and developing countries in particular (see Articles 7.10 and 13.3). Key issues are thus whether and how adaptation-related information can most efficiently be identified, collected, and collated by countries in order to meet their national needs, as well as reported to the global level. Depending on the scope, granularity, and accuracy of information required, collecting and reporting such additional information for the global stocktake could lead to additional burden of reporting (Kato and Ellis, 2016). One way of minimising the reporting burden would be to maximize synergies between what is included in these adaptation communications and information needed for efficient national adaptation planning and implementation (see UNFCCC (2017e) and Chapter 4 of this report).

⁵ More information on the adaptation components of the NDCs and the initial NDCs can be found in Kato and Ellis (2016), UNFCCC (2016b) and GIZ (2017).

⁶ Available at <<http://www4.unfccc.int/nap/Pages/national-adaptation-plans.aspx>>.

⁷ To support developing countries in their M&E efforts, supplementary materials have been developed by GIZ and IISD (Price-Kelly *et al.*, 2015) in collaboration with the Adaptation Committee and the Least Developed Countries Expert Group, which also developed the tool for monitoring and reviewing progress, effectiveness and gaps (Least Developed Countries Expert Group, 2015).

2.5 UNPACKING THE GLOBAL GOAL ON ADAPTATION

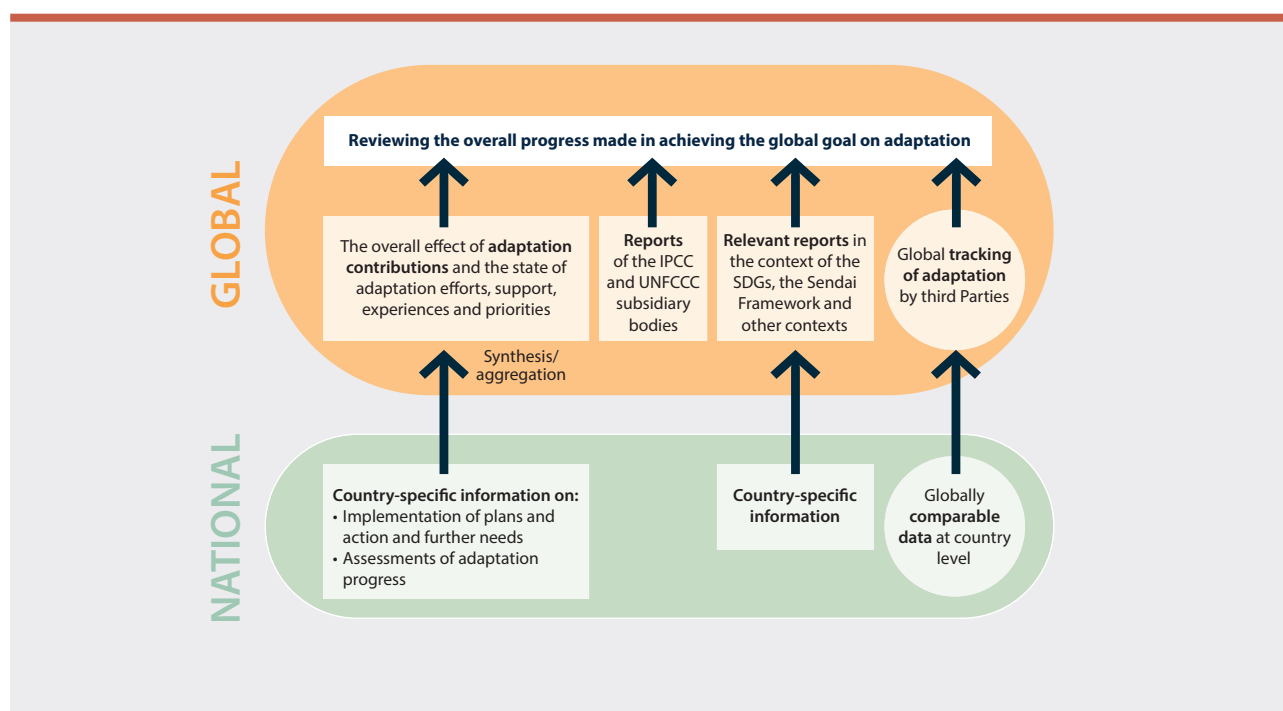
The global goal on adaptation is multifaceted and unspecified in terms of targets and indicators at national and global levels. While some regard the goal as qualitative (ActionAid *et al.*, 2016), others see it as semi-quantitative, as it links the qualitative concept of an “adequate adaptation response” with the quantitative aspect of the long-term objective of limiting global average temperature increase to well below 2°C (Ngwadla and El-Bakri, 2016). Three closely related concepts are included in the global goal on adaptation, namely: vulnerability, resilience and adaptive capacity (see the Glossary for definitions). Each of these concepts can be conceptualised in different ways and offers no uniform, objective opportunities for measurement (Leiter *et al.*, 2017). The IPCC also emphasises the dynamic character of vulnerability, implying that it results from a complex interaction between biophysical and social factors which differ between places and over time (IPCC, 2014).

Considering these complexities, the global goal on adaptation does not offer an immediate way of assessing progress, that is, how far countries have progressed (backward-looking) and how much more action and support is needed (forward-looking). Some countries and non-state actors have called for further elaboration of the goal, including for the development of metrics and indicators to allow both for the reflection of different circumstances in each country as well as for a more aggregate understanding of progress achieved (ActionAid *et al.*, 2016; Ngwadla and El-Bakri, 2016). Others point out that common indicators for generic application across contexts

have important limitations, and that flexible indicators among common domains could be more relevant for decision making (Leiter and Pringle, *Forthcoming*; Craft and Fisher, 2016; Leiter, 2015). Figure 2.2 presents complementary ways in which progress towards the global goal can be reviewed and how potential sources of information might contribute.

A review of progress could be based on a synthesis or aggregation of information provided by Parties to the UNFCCC (see Chapter 4). Such information can refer to implemented adaptation action and their results, including impacts on the degree of vulnerability or resilience. Further actions planned and support required could also be included. Adaptation could furthermore be tracked at the global level through a common methodology based on publicly available data (see Chapter 5). Finally, information collected for other purposes could complement adaptation reporting under the Paris Agreement and inform the global stocktake on adaptation, including reporting on progress made towards the Sustainable Development Goals (SDGs) and the Sendai Framework for Disaster Risk Reduction (see Box 1.1, Chapter 5, Chapter 6 and Leiter *et al.* (2017)). Given calls for prioritization of inputs from countries to ensure a country-driven assessment of collective progress made towards the global goal (UNFCCC, 2017a), the information provided by countries is crucial and should ideally feature some degree of comparability to be conducive to aggregation. The various sources of information are further explored in subsequent chapters.

Figure 2.2: Reviewing the overall progress in achieving the global goal on adaptation based on multiple sources of information





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CHAPTER 3

ASSESSING ADAPTATION PROGRESS AT THE GLOBAL LEVEL: CONCEPTUAL AND METHODOLOGICAL ISSUES

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3.1 INTRODUCTION

Chapter 2 provided an overview of the adaptation provisions of the Paris Agreement and looked at the types of adaptation information reported to the UNFCCC, highlighting agreed principles that should guide the assessment of progress on adaptation under the UNFCCC. It also outlined how other sources of information, outside the UNFCCC, could contribute to a review of collective progress on adaptation. This chapter focuses on general conceptual, methodological, and data availability issues surrounding assessments of adaptation progress, particularly at the global level. As outlined in Chapters

1 and 2, such assessments require that information be synthesized or aggregated in a transparent and systematic manner. To do so requires more generic frameworks and measurements that can be applied across countries and sectors. Currently, such frameworks are underdeveloped (Ford *et al.* 2015a). The chapter is structured in two main sections, where the first discusses key challenges for assessing adaptation progress (section 3.2), and the second looks at the current state of knowledge on adaptation assessment, particularly at the global level (section 3.3).

3.2 KEY CHALLENGES FOR ASSESSING ADAPTATION PROGRESS

Assessment of adaptation progress, particularly at the global level, is surrounded by a number of conceptual, methodological, and data availability issues. Studies show that to capture adaptation trends for the purpose of a robust global assessment of adaptation progress, information needs to be

collected across countries in a systematic, comprehensive, and consistent manner and at regular intervals, determined by the timescales over which adaptation is to be monitored. Key issues related to what and how to measure adaptation progress are discussed in the following.



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Box 3.1: Adaptation tracking research

Adaptation tracking is an emerging area of research that complements existing monitoring and evaluation practices by providing a high-level perspective on adaptation progress. The goal of adaptation tracking is to develop and implement scalable, systematic, and reproducible methodologies for assessing adaptation progress, and to simplify the complexity of the adaptation landscape to provide broad insights into where and how progress is being made (Magnan and Ribera, 2016; Leiter, 2015; Ford and Berrang-Ford, 2016; Berrang-Ford *et al.*, 2011). Adaptation tracking seeks to answer questions like: How is adaptation emerging in different places? Are we adapting more over time? As countries develop their adaptation activities, are there gaps emerging or persisting between or within places? The development and use of quantitative indicators is central to adaptation tracking, because they provide comprehensive means for comparing adaptation over time and across contexts. The emerging scholarly work on adaptation tracking is receiving substantial and growing interest in the research and decision-making communities. The methodologies being developed in this area offer promising pathways forward for informing adaptation plans, policies, and assessments, including under the Paris Agreement.

3.2.1 CONCEPTUAL CHALLENGES: WHAT TO MEASURE?

The Paris Agreement specifies that adaptation efforts should be based on a country-driven approach, and emphasizes the importance of integrating adaptation into socio-economic development activities. Vulnerability to climate change is the result of place-specific impacts and sensitivities to risk, and to the socioeconomic and environmental systems that shape capacity to adapt (Adger *et al.*, 2007). The country-driven nature of the Paris Agreement in regard to adaptation aims to align adaptive responses to the unique needs of countries and gives them ownership and control over the articulation of these needs (Lesnikowski *et al.*, 2017).

There is no universal definition of adaptation, and countries interpret adaptation and adaptation needs based on their national and sub-national contexts. Adaptation can be framed more narrowly as risk management activities in response to climatic drivers, or more widely as ongoing development work that addresses or transforms the underlying socioeconomic drivers of vulnerability, adaptive capacity, and resilience (Lemos *et al.*, 2016; Sherman *et al.* 2016). The complexities surrounding how adaptation is structured as a policy issue, combined with its intrinsic interlinkages with broader development issues - sometimes referred to as the 'fuzziness' of its boundaries - presents challenges for assessing adaptation progress (Robinson, 2017; Sherman *et al.* 2016; Ford *et al.* 2015a; Eakin *et al.* 2014). Making sense of these fuzzy boundaries requires the development of metrics that account for differences in how adaptation activities are framed, without introducing biases into global assessment frameworks that undermine objective, coherent, and consistent analysis (Ford and

Berrang-Ford, 2016). Given this ambiguity, a key question is how the global adaptation community can measure, aggregate, and assess adaptation progress made at the national level to gain insights into collective progress on adaptation (see Box 3.1).

In this context, it will be important to build a stronger understanding of how national adaptation monitoring and evaluation (M&E) systems define the relationship between adaptation activities and broader development contexts. An overview of the extent and nature of convergence (or divergence) of M&E systems across countries and regions, and how the relationship between adaptation and development is addressed, can provide insights for the design of an approach for global level assessments (see also Chapters 4 and 5).

3.2.2 CAPTURING MAINSTREAMING

Another key issue is how to identify adaptation-relevant activities that are mainstreamed into existing plans, policies, programs, and actions, but not necessarily labelled as climate change adaptation. Governments act on a wide range of issues that may not ostensibly intend to enhance adaptive capacity, reduce vulnerability, or strengthen resilience to climate change, but which have such benefits. Early adaptation assessment studies focused narrowly on the additional responses of governments to impacts of anthropogenic climate change, and sought to develop various tests for evaluating the relevance of different policies or interventions (Araos *et al.* 2016, 2015; EEA 2015, 2014; Ford *et al.* 2015b; Lesnikowski *et al.* 2015a; Massey *et al.* 2014; Panic and Ford, 2013; Bierbaum *et al.* 2012; Biesbroek *et al.* 2010). A common way to separate

Box 3.2: Tracking adaptation finance

Global estimates on the costs of adaptation suggest that the world may need to spend between US\$ 280 billion and US\$ 500 billion per year by 2050 on adaptation, with higher costs possible under higher emissions scenarios (UNEP, 2016). Developing countries are already experiencing an adaptation finance gap, which is expected to grow as adaptation needs increase with rising climate impacts. Financing for adaptation will flow not only from national and subnational government budgets, but also through dedicated climate funds, bilateral and multilateral development aid, non-governmental organizations, and the private sector. Establishing mechanisms for measuring, tracking, and reporting progress on adaptation will also support transparency of financial flows and efficiency of climate finance (Donner *et al.*, 2016).

Monitoring adaptation financing will be particularly important in the coming years because mobilization of financial resources is an important signal of political commitments to respond to climate change risk. There are, as yet, no clear methodologies for tracking global climate financing flows (UNEP, 2016). As levels of climate financing for adaptation increase, there is an increasing push for mechanisms to assess effectiveness, efficiency, adequacy, and legitimacy of financing.

adaptation policies from those that were designed to reach other policy objectives in these studies, was to look at whether climate change impacts are considered and inform the design of the policy interventions in question (Dupuis and Biesbroek, 2013).

3.2.3 SYSTEMATIC DATA COLLECTION AND THE RELATED REPORTING BURDEN

Currently, there are no readily available databases that provide comprehensive information on adaptation policies, programs, and activities across all countries. At the national level, there is some standardization in metrics and databases for monitoring of adaptation progress. However, given the diversity in what is being measured and how, metrics and data from these national-level frameworks cannot simply be scaled up and aggregated to conduct a global assessment of adaptation progress (see Chapter 5; Ford and Berrang-Ford, 2016; Dupuis and Biesbroek, 2013).

In the few cross-national datasets that exist, adaptation information is typically based on self-reporting and is not standardised or designed for global assessment purposes. Early adaptation progress studies frequently relied on the national communications to the UNFCCC for assessing progress, because they are the only information source available across all countries (including subnational levels of government), but these documents provide only a snapshot of adaptation priorities and activities (Lesnikowski *et al.*, 2017; 2015b; 2011; Gagnon-Lebrun and Agrawala, 2007).

Additionally, experience from cross-country adaptation assessments demonstrates a significant trade-off between the depth of information that the adaptation assessment can deliver and the amount of resources required. For examples, metrics that capture only plans, policies, and programmes labelled as climate change adaptation, will commonly deliver a much narrower set of activities, but require less time and financial resources to implement. Given the data requirements for a comprehensive global assessment of adaptation progress and the practical limitations of aggregating metrics used in national M&E systems, generating and integrating high-quality data is a key issue for making substantial progress on adaptation assessment. The Paris Agreement furthermore makes clear that reporting requirements should avoid creating an undue burdens on developing countries (Adaptation Committee, 2016).

Together, this highlights the important role of involving and engaging third-party contributors, including the Intergovernmental Panel on Climate Change and other research bodies, and of making use of existing data collected within established processes such as those for the SDGs and the Sendai Framework. As a starting point, however, guidelines from bodies like the UNFCCC to countries on the collection of adaptation information with universal and consistent reporting, would enhance access to comparable adaptation datasets at the national level, and limit the impacts of reporting bias (Lesnikowski *et al.*, 2015b).

3.3 THE CURRENT STATE OF KNOWLEDGE ON ADAPTATION ASSESSMENT

The current state of knowledge on adaptation assessment draws primarily from the knowledge and experience with M&E of adaptation at various scales (activity up to national level). This domain has expanded rapidly over the last decade, driven by the needs of development organizations, donors, and governments to measure the results of supported adaptation initiatives (Adaptation Committee, 2016; OECD, 2015; Silvestrini *et al.*, 2015; Brooks *et al.*, 2013; Leiter, 2013).

Monitoring and evaluation efforts have increased the understanding of how adaptation takes place and the

factors influencing the effectiveness of policies, plans, or programs. However, M&E has so far offered a limited perspective for answering broader questions about how adaptation takes place across countries, and for assessing global adaptation progress over time. Efforts to date to assess adaptation progress across countries and at a global level point to two broad approaches: assessing adaptation activities; and assessing adaptation results. Both are explored here. These approaches and metrics are important not just for the ability to assess progress on adaptation, but equally for an assessment of adequacy and sufficiency of adaptation action (see also Table 3.1).

Table 3.1: Assessing adaptation activities and results

	ADAPTATION ACTIVITIES	Indicator Examples	ADAPTATION RESULTS	Indicator Examples
Descriptive Questions	What is/are a country's key areas of adaptive capacity, resilience, and vulnerability?	Impact and vulnerability assessments, global risk maps	What has resulted from these activities?	Farmers use more efficient irrigation technologies to cope with water shortages
	What are a country's national adaptation goals and targets?	Visions, goals, targets set out in adaptation planning documents	How has adaptive capacity, resilience, and vulnerability changed?	Change in number of people living in flood plains, change in extreme heat mortality
	How are countries making decisions on adaptation?	National or subnational working groups, ministerial/departmental leadership, integration of equity and justice considerations into decision-making processes		
	What are countries doing to increase adaptive capacity and resilience, and decrease vulnerability?	Creation of national adaptation plans, public awareness-raising, reforms to standard operating procedures, legislative reforms		
	ADAPTATION ACTIVITIES	Judgements	ADAPTATION RESULTS	Judgements
Evaluative Questions	Are countries responding to the right risks, and in ways that do not create long-term maladaptation?	Do national impact and vulnerability assessments reflect scientific consensus?	Do outcomes meet goals and targets?	Are countries' adaptation efforts leading to the intended objectives?
	Do goals and targets reflect key areas of adaptive capacity, resilience, and vulnerability?	Are goals and targets sufficiently ambitious to address key risks?	Have changes in adaptive capacity, resilience, and vulnerability addressed a country's risk profile?	Are countries making sufficient progress fast enough?
	Do countries have robust decision-making processes?	Do governments demonstrate decision-making processes that represent the spirit of the Paris Agreement (e.g. gender-responsive, participatory, transparent)?		
	Are countries making sufficient effort to meet goals and targets?	Are countries doing enough to adapt to current and future risk?		

3.3.1 ASSESSING ADAPTATION ACTIVITIES

Assessment of adaptation activities examines what countries are doing to increase adaptive capacity and resilience, and decrease vulnerability. These assessments can be descriptive or evaluative in nature. As Table 3.1 indicates, descriptive assessments of adaptation ask non-judgmental questions such as: what are a country's key vulnerabilities or areas of adaptive capacity and resilience? What are a country's national goals and targets on adaptation? How are decisions being made within countries? What are countries doing to address climate change risk? Future steps in the development of a global assessment framework will need to identify comprehensive metrics that can be applied systematically to describe adaptation activities across countries, and that can be analysed on a global scale (see also Box 3.3).

Different types of metrics will answer different descriptive questions. Common metrics include the scope of the goals and targets set out in strategic planning documents, the location of responsibility for decision-making, the nature of decision-making coordination across departments or agencies, or the types of activities that are being pursued within adaptation portfolios. These types of metrics already tend to be used by governments at various levels in existing monitoring and evaluation systems, and have potential for being aggregable to the global level. Metrics that capture the organizational and administrative aspects of adaptation annotate whether governance structures are in place to support adaptation, whether there is evidence of growth or dismantling of these structures, and whether equity and participatory considerations are being taken

during planning processes. In the context of climate change, where long time horizons mean that the impact of policies may not be visible for some time and there is considerable uncertainty about the future, these types of metrics are often advocated as short and medium-term ways to assess whether stakeholders are creating positive conditions and strong institutions to enable adaptation. They do not, however, highlight what governments are doing to directly reduce exposures and vulnerability (Robinson, 2017; Lwasa, 2015; Kumamoto and Mills, 2012; Mannke, 2011, 2010).

Policy-focused **descriptive metrics** look specifically at the interventions that governments are implementing to respond to current or future impacts and vulnerabilities (Henstra, 2016). This approach focuses on how adaptation objectives are being defined and translated into policies, plans, and programs, and whether these activities are accumulating over time to address key aspects of risk and vulnerability. Essentially, policy-oriented metrics provide insights into what countries are doing to reduce their climate risks.

A related, second, category of questions about adaptation activities is **evaluative questions**. These questions examine whether the collection of adaptation policies, plans, and programmes identified through descriptive metrics are sufficient to achieve progress on adaptation. Are countries responding to the "right" climate risks? Are goals and targets reflective of the most important aspects of adaptive capacity, resilience, or vulnerability? Are decision-making processes robust and inclusive? Are countries making sufficient efforts to achieve their

Box 3.3: Experience from studies providing global assessments of adaptation

Existing global assessments of adaptation have been limited by issues of data quality and accessibility, which has led to the use of proxy measurements for capturing relative states or changes in societal levels of adaptation. Early global adaptation assessment studies relied primarily on activities-based metrics of adaptation to assess progress, for example, assessing whether national adaptation plans were in place, and indicating the ministries or departments tasked with leading adaptation planning efforts (Austin *et al.* 2016; Tilleard and Ford, 2016; Lesnikowski *et al.* 2015a; Reckien *et al.* 2015; Reckien *et al.* 2014; Heidrich *et al.* 2013; Lesnikowski *et al.* 2011; Gagnon-Lebrun and Agrawala 2007). These studies aimed to understand how governments create institutional environments to mobilize adaptation actions and what types of policies they adopt. However, they have been critiqued for: over-reliance on the number of adaptation activities identified as a proxy of adaptation progress; lack of validation of connection between indicators used to measure adaptation and their effect on adaptive capacity; resilience and vulnerability; overlooking the substance of policy development; not adequately accounting for mainstreamed adaptation activities; and for relying on a limited number of data sources. The quantity of adaptation activities reported is not necessarily indicative of progress towards a more adapted society; adaptation efforts may be either maladaptive or superficially labelled adaptation but without substantive impact on long-term risks (Hupe *et al.* 2014; Massey *et al.*, 2014; Dupuis and Biesbroek, 2013; Ford *et al.*, 2013).

goals and targets? These questions cannot be answered directly through data collection and synthesis, because evaluative responses are influenced by individual and collective perceptions, values, and expectations about adaptive change. Evaluative assessments of adaptation activities thus require the articulation of principles that will structure analysis, deliberative processes that allow multiple perspectives to be heard, and recognition that adaptation is not simply a technocratic exercise, but a political process through which there are winners and losers (Shi *et al.*, 2016).

3.3.2 ASSESSING ADAPTATION RESULTS

The second approach to assessing adaptation progress focuses on conceptualizing and measuring the results of adaptation policies, plans, and programmes. In policy evaluation terms, this approach aims to measure the outcomes and impacts of adaptation activities. Descriptive inquiry of adaptation results asks what the effect of various activities has been against the goals or targets of policies, plans, and programs, and looks at broad changes in vulnerability status, adaptive capacity, and resilience.

Assessment of adaptation results vis-à-vis adaptation activities is closely linked with policy monitoring methods. These allow an assessment of how closely the observed outcomes of specific activities align with their expected contributions. On the other hand, impact-focused assessment makes observations about longer-term changes in vulnerability status, including exposures, sensitivities, and adaptive capacity. Implicit in this is the question of whether the “problem” is gradually improving or worsening over time. These approaches include efforts to measure changes in key vulnerabilities such as food security or livelihoods, and to measure aspects of the political, economic, social, and environmental contexts that shape our capacity to adapt to climate impacts. Understanding these dynamics is a key starting point for assessing whether adaptation efforts are making a positive contribution to resilience-building or vulnerability reduction.

The major ambition of results-based adaptation assessments is to find ways of measuring the contributions of adaptation activities to changes in adaptive capacity, resilience, and vulnerability. These changes are influenced by a complex web of factors, such as general levels of development and the unintended influences from government activities in other sectors. Isolating the added contribution of intentional adaptation intervention is a key challenge for adaptation assessment. It is not, however, a challenge unique to adaptation, and adaptation assessment can learn from approaches and methods being applied in other areas of government policy (Ford *et al.*, 2013). A key challenge for global adaptation assessment going forward will be making sense of political commitments on adaptation and the likelihood that they will be effective in the long term. This suggests that it is important to distinguish between adaptation policies that aim for observable changes in vulnerability, adaptive capacity, and resilience – what might be termed substantial adaptation – and actions whose impacts are perhaps largely rhetorical in nature (Dupuis and Biesbroek, 2013).

Being able to attribute changes in resilience or vulnerability to specific policy interventions not only addresses questions about whether implemented actions are effective in reducing vulnerability but also catalyzes normative questions like: Are we doing enough to adapt to impacts of climate change? Should governments or other actors be doing more or be doing something different? Similar to evaluative assessments of adaptation activities, responses to evaluative questions on adaptation results will be influenced by expectations, values (including risk tolerances), preferences, and perceptions. However, such consensus on assessment results cannot be reached by merely relying on data. Attributing outcomes and impact to inputs and action directly is unlikely to be reliable or comparable at the national level or consistent across nations. Instead, narratives can be used to assess contribution and qualitative evidence to support quantitative indicators (see Chapter 5 and Chapter 6).



04



CHAPTER 4

COUNTRY-SPECIFIC ASSESSMENTS OF ADAPTATION PROGRESS

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4.1 INTRODUCTION

Many developing countries are undertaking efforts towards climate resilient development planning and implementation, including through the National Adaptation Plan (NAP) process and the adaptation components in their Nationally Determined Contributions (NDCs) (GIZ, 2017a). Assessing progress towards national adaptation goals and targets, such as tracking the implementation and results of strategies, policies, and programmes, or monitoring changes in the level of climate risks and vulnerabilities, are therefore increasingly

important tasks. Accordingly, many governments have initiated ways to assess their adaptation progress through country-specific adaptation monitoring and evaluation (M&E) systems. Based on the current literature and several country case studies, this chapter provides an overview of the characteristics and the current states of national adaptation M&E systems, and discusses the opportunities and limits of assessing adaptation progress at national level to contribute to provisions of the Paris Agreement, in particular the global stocktake.

4.2 OVERVIEW AND CHARACTERISTICS OF COUNTRY-SPECIFIC ADAPTATION M&E SYSTEMS

At least 40 countries spanning all continents and levels of economic development are currently developing or are already operating national adaptation M&E systems (GIZ, 2017b; EEA, 2015; Naswa *et al.*, 2015; OECD, 2015; Hammill and Dekens, 2014; Leiter, 2013). Four generic stages of development of adaptation M&E systems can be distinguished and examples of the stages countries' M&E systems are currently in are listed in Table 4.1:

1. **Initial steps** that include defining the M&E purpose, identifying information needs and users, and engaging stakeholders;
2. **Advanced elaboration**, including clarified M&E purpose and content, advanced development of the M&E

methodology, identified data sources, agreed institutional agreements, and targeted formats for communication and reporting;

3. **Fully operational monitoring and reporting**, including routine data gathering, sharing and analysis, and regular communication and reporting;
4. **Evaluations of national adaptation progress**, referring to explicit evaluations of national adaptation efforts, including strategies, plans, actions and their results, with a particular focus on identifying cause-effect relationships, and providing recommendations for improvement.

Table 4.1: Development stages of adaptation M&E systems with country examples

	Beginning → Fully operational			
	Monitoring			Evaluation
Development stage of the M&E system	Initial steps	Advanced stage, but not completely operational yet	Fully operational and regularly reporting	Explicit evaluations of national adaptation progress
Examples	Argentina, Australia, Albania, Brazil, Cameroon, Costa Rica, Grenada, Lithuania, Mozambique, Slovakia, Sri Lanka, Thailand, Togo	Burkina Faso, Cambodia, Colombia, Kenya, Moldova, Netherlands, Philippines, South Africa, Uganda	Austria, Belgium, Finland, France, Germany, Morocco (sub-national level), Spain, Switzerland, United Kingdom	Chile, Finland, Switzerland, United Kingdom

Note: The table is based on available literature but may not be exhaustive. Some countries may be missing, in particular those recently working on adaptation M&E as part of their NAP process and those that have not yet reached the stage of submitting their NAP to the UNFCCC.

Adaptive management, learning, accountability, and meeting reporting requirements are among the main reasons for developing national adaptation M&E systems (EEA, 2015; Price-Kelly *et al.*, 2015). Through their adaptation M&E systems, countries can better understand to what extent implementation of policies, strategies and actions has taken place, and whether it has led to the intended results. For example, the progress assessment and reporting by the United Kingdom's Committee on Climate Change is informing the periodic revision of the United Kingdom's National Adaptation Programme (Committee on Climate Change, 2017). In combination with national climate risk or vulnerability assessments, it can also be determined whether actions have been adequate and effective, and this can further guide policy and investment decisions. These domestic benefits have often motivated countries to develop national adaptation M&E systems for their specific circumstances. In addition, international or regional influences may also play a role, for example in Europe through the provisions of the European Union Adaptation Strategy, or globally through the momentum and guidelines of the NAP process (see Box 4.1). Experience so far points to domestic actors being the main users and beneficiaries of national adaptation M&E systems, but these systems can also provide important information for international reporting, as will be discussed in section 4.5.

Country-specific adaptation M&E systems are normally tailored to their unique national policy contexts and climate risk profiles. Although this leads to a great diversity of approaches, common components can be defined. The Adaptation Committee and the Least Developed Countries Expert Group, in collaboration with Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) and the International Institute for Sustainable Development (IISD), defined four building blocks that constitute a national adaptation M&E system and may guide the design of future national M&E systems (Price-Kelly *et al.*, 2015), namely:

1. **Context:** what is the policy context the M&E system operates in and what is the M&E purpose?
2. **Content:** what information is required to address the purpose?
3. **Operationalization:** how will the information be gathered and what are the institutional arrangements for data sharing and analysis?
4. **Product:** how is the generated information used and disseminated?

Figure 4.1 illustrates these four building blocks and their interrelations. Guiding questions as part of the supplementary materials to the “reporting, monitoring and review” element of the NAP technical guidelines provide orientation to develop useful and country-specific adaptation M&E systems (Price-Kelly *et al.* 2015). National assessments of adaptation progress can be further characterized on a number of dimensions, which are analyzed in detail in GIZ (2017b), OECD (2015) and Hammill and Dekens (2014):

- What type of **mandates** exist for the development of the adaptation M&E system? Some countries, like Mexico and the United Kingdom, have a legislative requirement in the form of a climate change law directing them to put in place an M&E system for adaptation. In other cases, like in South Africa and Germany, the mandate is stipulated by national climate change policies and strategies, by NDCs, like in Cambodia and Morocco, or as part of the NAP process, like in Brazil and Thailand;
- What is the main **purpose** of adaptation M&E? In many countries it is to track implementation and results of policies and actions, often combined with the purpose of informing planning and decision-making, although the link to decision-making processes varies considerably

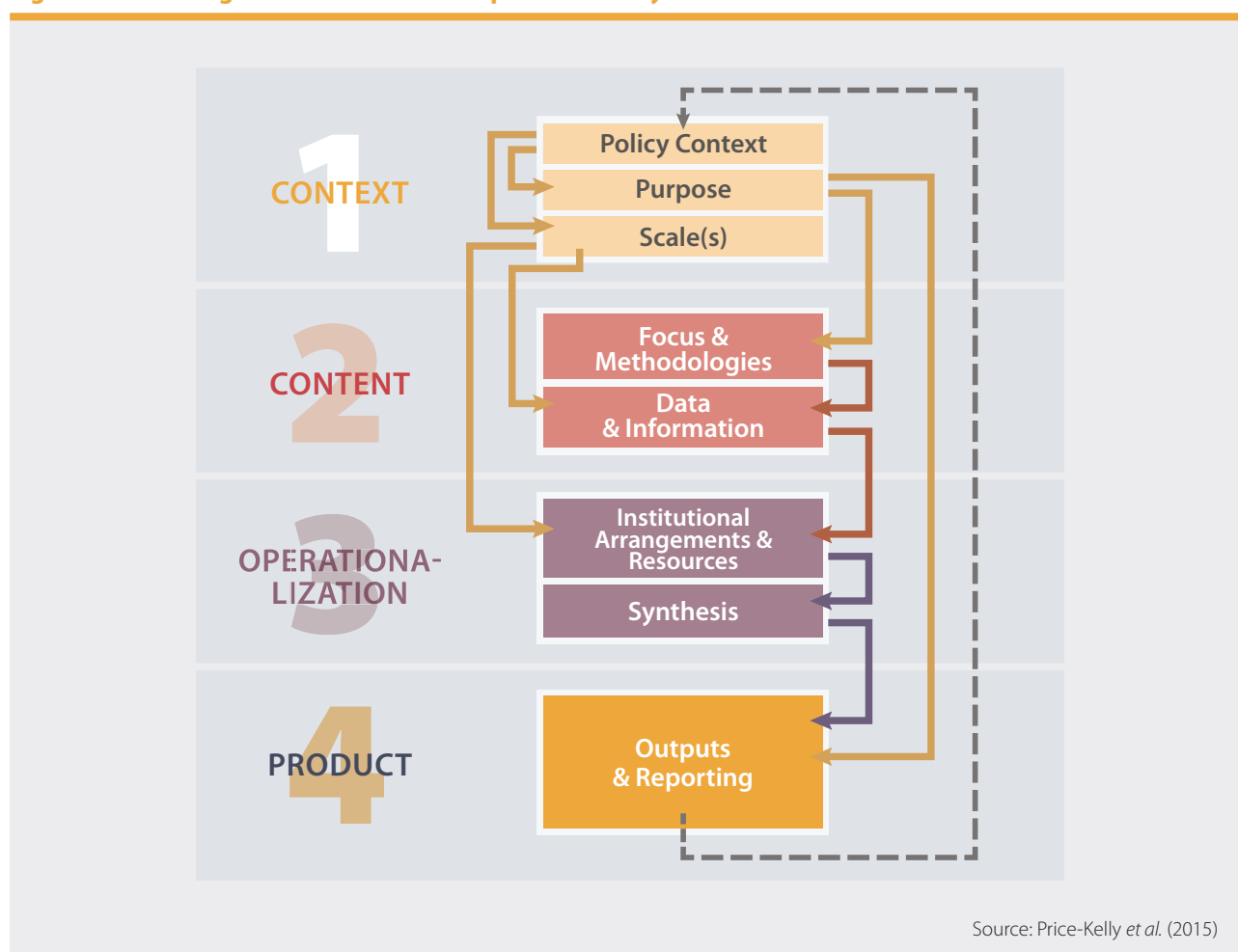
Box 4.1: M&E as part of the National Adaptation Plan (NAP) process

The objectives of the **NAP process**, as adopted by COP17, are to: a) reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience; and b) facilitate the integration of climate change adaptation into relevant new and existing policies, programmes, and activities, in particular development planning processes and strategies (Decision 5/CP.17). As an ongoing government process, NAPs can support the implementation of adaptation components of countries' NDCs (GIZ, 2016). The NAP Technical Guidelines developed by the Least Developed Countries Expert Group under the UNFCCC include “reporting, monitoring and review” as one of four NAP elements (Least Developed Countries Expert Group, 2012). Accordingly, several countries are developing national adaptation M&E systems as part of their NAP process. Specific guidance for M&E of the NAP process is provided in supplementary material developed in collaboration with the Adaptation Committee and the Least Developed Countries Expert Group (Price-Kelly *et al.*, 2015).

among countries. Some adaptation M&E systems put more emphasis on accountability, whereas others focus more on learning;

- Which **content** is the adaptation M&E system mainly covering? Some focus exclusively on the implementation of national adaptation programmes, that is whether defined actions are implemented according to plan, as is the case of Mexico's Special Program on Climate Change, while others monitor climate vulnerability and adaptation through an integrated approach, like in Morocco, or through different components of an adaptation M&E system, like in Colombia;
- What is the **scope** of the M&E system, and which sectors and levels of government are included? Some countries, like France or Germany, focus mainly on efforts taken by the national government, whereas others incorporate information from any government level (for example South Africa) or focus also on municipalities (for example the Philippines);
- Which **methodologies** are used to make the M&E system work? A variety of methodologies have been used so far, including results chains with output and outcome indicators (Philippines), frameworks or theories of change with associated indicators (Cambodia, Kenya), periodic national vulnerability and risk assessments (United Kingdom, Germany), and combinations of these or other methodologies;
- Which **institutional arrangements** exist for data sharing and coordination among actors? In many countries the ministry responsible for adaptation policy is also coordinating the development of the adaptation M&E system, while some countries use technical agencies for its implementation, for instance Germany, Austria, and the Netherlands. The United Kingdom has created an independent committee through its Climate Change Act, which is mandated to perform adaptation progress assessments;
- What **types of outputs and reporting** are used to communicate the findings of the M&E system, and how are they linked to planning and decision-making? In the United Kingdom, for example, biennial progress reports are presented to parliament to inform the revision of the National Adaptation Programme. Online databases and websites are also developed by several countries to make the information easily available and reach a larger audience.

Figure 4.1: Building blocks of national adaptation M&E systems



4.3 CASE STUDIES OF NATIONAL ADAPTATION M&E SYSTEMS

The following examples of national adaptation M&E systems were chosen with a view to demonstrate a diversity of approaches, geographic coverage, and lessons for other countries. Additional examples are available as country M&E factsheets from GIZ (2017b) as well as in studies by EEA (2015), OECD (2015), Naswa *et al.* (2015), Brooks and Fisher (2014), and Hammill and Dekens (2014). Adaptation metrics at national level are also discussed by Leiter and Pringle (forthcoming), Climate-Eval (2015), and Hammill *et al.* (2014).

4.3.1 CAMBODIA⁸

POLICY CONTEXT AND PURPOSE

Cambodia's Climate Change Strategic Plan (CCCSP 2014-2023) identifies key priority adaptation and mitigation measures. The Plan underlines the importance of establishing mechanisms to assess the progress being made in the implementation of the country's response, setting out the vision of a climate change M&E system fully integrated into national and sub-national development planning processes. The purpose of the national M&E system is to: a) measure how effective adaptation efforts keep development on track; b) generate evidence and lessons to inform future policy making; c) facilitate the coherent integration of climate change into national planning and key sectors; and d) provide information required to fulfil the reporting obligations to the UNFCCC and development partners. The national adaptation M&E system, whose development has been proposed in Cambodia's Intended Nationally Determined Contribution, was officially launched in April 2016.

CONTENT OF THE ADAPTATION M&E SYSTEM

Cambodia's adaptation M&E system adopts a twin-track approach. On the one hand it assesses how well the national institutions are managing climate risks – through institutional readiness indicators – and, on the other – through impact indicators – how successful climate interventions are at reducing vulnerability or lowering carbon emissions (see Table 4.2). The Cambodian M&E system operates at national as well as sub-national levels taking all key climate sensitive sectors into account. The Commune database is the main channel for accessing data from the local level and is being used for the impact indicators related to adaptation. The institutional readiness indicators are measured with scorecards, which are applied through self-assessments by the key climate change sensitive sectors/ministries.

EXPERIENCES AND LESSONS LEARNED

Despite some difficulties in collecting data, the development of the national M&E system has already helped key sectors in their planning and in defining climate change investments on the national and local levels. The advancement of sectoral M&E systems could further assist in this process. As the national M&E system is dependent on concerted participation of a large amount of stakeholders, robust coordination mechanisms become crucial. A harmonization of the timeframes between sectoral, national, and international reporting could streamline coordination and reduce the burden on key stakeholders.

⁸ GIZ (2017b); Department of Climate Change, Cambodia (2016); Rai *et al.* (2015); Cambodia National Climate Change Committee (2013).

Table 4.2: National adaptation M&E indicators of Cambodia

Track 1: Institutional readiness indicators	Track 2: Impact indicators
Climate policy and strategies: Status of development of national policies, strategies, and action plans for climate change response	Percentage of communes classified as 'highly vulnerable' and 'quite vulnerable' according to a vulnerability index. Results can be disaggregated by hazard type (flood, drought, and storm)
Climate integration into development planning: Status of inclusion of climate change in long, medium, and short term national and sub-national planning	
Coordination: Status and functionality of a national coordination mechanism for climate change response and implementation of the Cambodia Climate Change Strategic Plan	Families affected due to floods, storms, and droughts: Proportion of families affected by these extreme weather events (measured in number of affected families per 1,000 families)
Climate information: Status of production, access, and use of climate change information	GHG emissions: GHG emissions by sectors and per capita
Climate integration into financing: Status, availability, and effectiveness of a financial framework for climate change response	Plus 2-3 indicators per sector

4.3.2 COLOMBIA⁹

POLICY CONTEXT AND PURPOSE

Colombia launched its National Adaptation Plan in 2012, to include climate change considerations into the planning instruments of seven priority sectors of the economy: transport, energy, agriculture, housing, health and trade, tourism, and industry. Furthermore, Colombia is advancing towards the design of a National System of Adaptation Indicators to monitor and evaluate the implementation of adaptation measures. The development of the adaptation indicator system is a prioritized action of Colombia's Intended Nationally Determined Contribution.

CONTENT OF THE NATIONAL ADAPTATION M&E SYSTEM

The National System of Adaptation Indicators seeks to enable M&E of the implementation of adaptation actions as well as monitoring changes in each municipality regarding climate hazards, sensitivity, and adaptive capacity (Ministerio de Ambiente y Desarrollo Sostenible de la República de Colombia, 2015). The latter will include a geographical

component that would offer the opportunity for regional analysis and tracking progress of implemented actions. Additionally, in September 2017 Colombia launched its Third National Communication, assessing vulnerability and climate risk through a set of indicators.

The national vulnerability assessment guides the regional priorities across the country, while the National Adaptation Indicators System guides the sectorial priorities and Colombia's NAP guides the planning processes of adaptation from a national level. Together, they provide orientation to local and regional projects, which generate indicators in accordance with the national indicator guidelines and, in dialogue with communities, account for both national and local scales. The projects can use primary information and tailored indicators for their specific context in addition to using some of the national indicators from the National Adaptation Indicators System or those of the Third National Communication, both of which are based on official data with national coverage.

EXPERIENCES AND LESSONS LEARNED

Using uniform concepts and terminology across different territorial scales is key to enable a coherent M&E system of adaptation actions and processes, and recognize adaptation

⁹ Government of Colombia (2017); Ministerio de Ambiente y Desarrollo Sostenible de la República de Colombia (2015).



Photo: © Manon Koningstein (CIAT)

efforts. For instance, simultaneously mainstreaming adaptation at national level and implementing at local level has had the benefit of mutual learning, such that guidelines and local processes on adaptation efforts are interpreted in the context of territorial needs. However, there are still weaknesses of information flows at different scales and therefore opportunities to improve the system by strengthening local capacity and data gathering.

The assessment of adaptation actions and processes is linked with the monitoring, reporting and verification (MRV) of mitigation actions via the evaluation mechanisms of the National Climate Change Policy. This is an opportunity to harmonize different efforts in order to have a single climate change M&E system and platform for the country and to identify co-benefits between mitigation and adaptation efforts.

4.3.3 MOLDOVA¹⁰

POLICY CONTEXT AND PURPOSE

The Climate Change Adaptation Strategy of the Republic of Moldova (2014) provides an integrated vision to react to the impacts of climate change. Moldova is currently establishing a NAP process and Sectoral Adaptation Planning processes (SAP), which are coordinated by the Climate Change Adaptation Coordination Mechanism (CCACM) and chaired by the National Commission on Climate Change (NCCC).

CONTENT OF THE ADAPTATION M&E SYSTEM

The goal of the M&E system is to ensure progress on adaptation across geographic scales, time, and sectors can be measured, and to determine whether, as a result of its successive plans, Moldova is less vulnerable to the impacts of climate change. The adaptation M&E system will monitor: a) progress and evaluate impacts of implemented policies; b) implementation of adaptation related planning, technologies and practices; c) development and dissemination of adaptation related knowledge and research; and d) adaptation related financing and investments, including external support received.

The M&E framework is based on the need to monitor progress towards achieving resilient economic growth. It monitors sector-based activity as well as their aggregate impact on the overall economy. Tracking of national or sectoral adaptation achievements at the outcome level will be accompanied by assessing the adaptation results of individual actions. The indicator-based M&E system consists of four types of indicators and is operated through the Climate Change Adaptation Information System, consisting of a monitoring platform designed to facilitate data management and monitoring, and an online portal intended for presenting public information:

- **Driver indicators:** measuring the result of actions targeting the drivers of change, including: a) mobilized resources; b) capacity to plan adaptation; c) knowledge on climate risks, impacts, and vulnerabilities;
- **Output indicators:** measuring the implementation of adaptation actions included in the Sectoral Adaptation Planning;
- **Outcome indicators:** measuring the result of the Sectoral Adaptation Planning in terms of reduced sectoral vulnerability and advancing in adaptation/resilience;
- **Objective indicators:** measuring the aggregate result of a NAP cycle, in terms of impacts on the vulnerability of the Moldovan economy and progress on adaptation.

In addition, Moldova is implementing the climate budget tagging (CBT) process that aims at improving the understanding of how much is being spent on national climate change responses. Four Climate Change Budget Indicators (CCBIs)/climate markers have been established: a) policy development and governance; b) research and development; c) knowledge sharing and capacity building; and d) climate response and service delivery. The whole M&E system is supporting the Republic of Moldova's communication to UNFCCC on adaptation and will either become part of the national communication or a separate document as adaptation communication.

EXPERIENCES AND LESSONS LEARNED

A holistic M&E system, covering both national and sectoral objectives and priorities, and taking different types of indicators into account, can assess economy-wide adaptation progress. Climate budget tagging provides supplementary information on the overall spending volume and its distribution among spending categories. At the same time, possibilities of allowing adaptation monitoring at regional and global levels need to be considered to achieve the greatest synergies.

The implementation of M&E needs to be accompanied by strong capacity building activities to engage stakeholders and create ownership and vertical integration from local to national levels.

4.3.4 SOUTH AFRICA¹¹

POLICY CONTEXT

South Africa's National Climate Change Response White Paper (NCCRWP) and the National Development Plan (NDP) present a vision for an effective response to climate change (Department of Economic Affairs, South Africa, 2011). The National Climate Change Response White Paper and National Development Plan address the immediate

¹⁰ Republic of Moldova (2014).

¹¹ GIZ (2017b); Department: Environmental Affairs of South Africa (2011, 2016); National Planning Commission of South Africa (2011).

and observed threats of climate change to the country's society, economy, and environment and provide the basis for tracking South Africa's transition to a climate-resilient society and lower-carbon economy. South Africa has published the first Climate Change Annual Report in 2016 and is about to publish the second whilst also finalizing the third national communication. The reports outline South Africa's progress towards the objectives of the National Climate Change Response White Paper.

CONTENT OF THE ADAPTATION M&E SYSTEM

An M&E system has been developed to track the transition towards a climate-resilient society guided by chapters 5 and 12 of the NCCRWP. The system consists of three building blocks: a) climate information; b) climate risks, impacts and vulnerability; and c) understanding the effectiveness of climate-resilient measures. The building blocks have been further broken down into Desired Adaptation Outcomes to facilitate and focus monitoring and evaluation of South Africa's progress towards climate resilience. Desired Adaptation Outcomes aim to provide clarity and understanding about the measures to be taken by South Africa in adapting to climate change, help capture the country's unique circumstances to support reporting on adaptation at national and international levels, and identify desired states that will contribute to climate resilience in the short to medium-term (that is over the next 5 to 20 years). They will also provide a means of assessing the capacity of sectors at risk and their

stakeholders to adapt to climate change, and whether the measures being taken are appropriate, efficient, and effective in building resilience.

Table 4.3 shows nine generic Desired Adaptation Outcomes, which fall into two distinct groups: six describe the 'inputs' (for example processes, resources, and capacities) that need to be in place to enable effective climate change adaptation; and three describe the key 'impacts' of adaptation interventions (for example reductions in vulnerability of human and natural systems). In addition, sector-specific Desired Adaptation Outcomes can be developed.

The information collected on Desired Adaptation Outcomes will be available through a web-based platform and will be used to: a) inform policy and decision-making; b) address reporting obligations (nationally and internationally); and c) replicate what has worked well. Key players include national sector departments, provinces, municipalities, business, research, and non-governmental organizations.

EXPERIENCES AND LESSONS LEARNED

Key lessons learned include the importance of stakeholder buy-in and ownership, and that standard indicators might not be appropriate for a flexible M&E system that includes multiple levels of government. Instead, providing a clear M&E system can guide stakeholders in undertaking adaptation monitoring and evaluation in a meaningful and coherent way.

Table 4.3: Generic desired adaptation outcomes of South Africa

Desired Adaptation Outcomes	
<i>'Inputs' to enable effective adaptation</i>	
G1	Robust/integrated plans, policies, and actions for effective delivery of climate change adaptation, together with monitoring, evaluation and review over the short, medium, and longer-term
G2	Appropriate resources (including current and past financial investments), capacity, processes (human, legal, and regulatory), and support mechanisms (institutional and governance structures) to facilitate climate change adaptation
G3	Accurate climate information (for example historical trend data, seasonal predictions, future projections, and early warning of extreme weather and other climate-related events) provided by existing and new monitoring and forecasting facilities/networks (including their maintenance and enhancement) to inform adaptation planning and disaster risk reduction
G4	Capacity development, education, and awareness programmes (formal and informal) for climate change adaptation (for example informed by adaptation research and with tools to utilise data/outputs)
G5	New and adapted technologies/knowledge and other cost-effective measures (for example nature-based solutions) used in climate change adaptation
G6	Climate change risks, impacts, and vulnerabilities identified and addressed
<i>'Impacts' of adaptation interventions and associated measures</i>	
G7	Systems, infrastructure, communities, and sectors are less vulnerable to climate change impacts (e.g. through effectiveness of adaptation interventions/response measures)
G8	Non-climate pressures and threats to human and natural systems are reduced (particularly where these compound climate change impacts)
G9	Secure food, water, and energy are supplied for all citizens (within the context of sustainable development)

Source: GLZ (2017b); Department of Environmental Affairs, South Africa (2011, 2016); Harley *et al.* (2008).

4.4 ANALYSIS OF NATIONAL ADAPTATION M&E SYSTEMS TO DATE

The examples presented above illustrate the diverse and context-specific nature of country-level M&E systems to assess national progress on adaptation. In connection with an analysis of the literature, a number of observations can be made from the experiences gained to date.

ENGAGEMENT OF STAKEHOLDERS DURING THE DEVELOPMENT PROCESS

In most countries the development process of the national adaptation M&E systems has been led by the government body responsible for the coordination of adaptation policy. The primary stakeholders have often been other government entities at national and sub-national levels, which are directly affected by monitoring and reporting provisions, and their buy-in and cooperation are of major concern for the implementation of adaptation M&E. In addition, most countries have conducted some form of stakeholder engagement beyond government agencies, albeit to different degrees and with variable outcomes.

MONITORING OR EVALUATION

Most of the national adaptation M&E systems in use today are still largely focusing on monitoring, with very few employing systematic means to explain what caused or hampered adaptation progress (see Table 4.1). In this regard there are opportunities to enhance the capacity of the systems to assess whether adaptation efforts have had the desired effects.

USE OF INDICATORS

Although most national adaptation M&E systems employ indicators, they vary considerably between countries. An analysis of indicators used by national adaptation M&E systems found that they can be categorized according to their focus on climate change impacts, adaptation processes, or actions, and adaptation results (Leiter and Olivier, 2016; Hammill *et al.*, 2014b). While important, indicators are only one part of an M&E system, and their



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formulation should be preceded by the development of a framework defining purpose, information needs, and target audience. Quality criteria can guide indicator development (Climate-Eval, 2015), but their relevance for adaptation needs to be specified for a given context (Hammill *et al.*, 2014).

DATA SOURCES AND LINKS TO EXISTING M&E SYSTEMS

Adaptation M&E systems do not need to be new and separate. They can often build on existing data and monitoring structures. Their added value lies in the combination of available information with additional data to get a better overview of adaptation in the country. Synergies can also be explored with national monitoring and reporting of related international agreements, in particular the SDGs and the Sendai Framework for Disaster Risk Reduction (Leiter *et al.*, 2017).

ONE SYSTEM, MULTIPLE COMPONENTS

Progress on climate adaptation can be captured in multiple ways and through various M&E systems. For example, existing sector-specific monitoring frameworks may integrate adaptation as an add-on. Alternatively, country-specific adaptation M&E systems can also have multiple components, each responding to a particular purpose. For instance, periodic national climate risk and vulnerability assessments can indicate changes in priority risks over time, while monitoring the implementation of adaptation and its results can indicate achievements and gaps, and evaluations can examine effectiveness

and generate lessons learned. Each of these approaches yields different information, which together can provide a comprehensive picture of a country's adaptation progress.

CHALLENGES OBSERVED IN THE DEVELOPMENT AND IMPLEMENTATION OF NATIONAL ADAPTATION M&E SYSTEMS

A number of similar challenges have emerged across countries in the development and implementation of national adaptation M&E systems (EEA, 2015; Hammill and Dekens, 2014; Leiter, 2013). The typical challenge at the beginning of the process is to clarify the exact purpose and content of the M&E system, and to create ownership and buy-in from stakeholders, particularly those needed for implementation. Countries have required between two years and five years to develop and fully implement their national adaptation M&E, including countries with high capacities like Germany or the United Kingdom. A major time-consuming factor is the large number of sectors affected by climate change, which requires the involvement and coordination of many actors within government and beyond. After the development phase, barriers to implementation include reluctance to share data, a limited mandate to involve key government stakeholders, limited technical capacities, and human and financial resources. As a result, some countries have been unable to implement their adaptation M&E systems despite the availability of several bi- and multilateral support programmes and exchange platforms. This underscores the need for continued support and capacity building on adaptation M&E and transparency.

4.5 OPPORTUNITIES AND LIMITS OF COUNTRY-SPECIFIC ADAPTATION M&E SYSTEMS TO SUPPORT THE PROVISIONS OF THE PARIS AGREEMENT

National adaptation M&E systems provide useful information for reporting on countries' progress on adaptation, which can be used domestically as well as internationally. The information can be used to report to the respective provisions of the Paris Agreement, in particular the transparency framework and the adaptation communications. Table 4.4 illustrates types of information that adaptation M&E systems can provide. Several of these are currently not, or only

partially, available through existing UNFCCC reporting vehicles (Kato and Ellis, 2016). For instance, national communications have so far largely focused on reporting vulnerability and governance aspects with rather limited reporting on actual adaptation interventions, and almost no reporting on their contribution to reducing vulnerability (Lesnikowski *et al.*, 2015). The added value of national adaptation M&E systems therefore is to go beyond descriptions of vulnerabilities and impacts, and

Table 4.4: Types of information produced by national adaptation M&E systems

Focus	Type of information	Country examples
Process / output-based	Extent of implementation of national strategies, plans, or processes	The M&E systems of Austria, France, and the United Kingdom measure the percentage of implementation of national action plans
	Extent of mainstreaming of adaptation across sectors and levels of government	The M&E systems of Cambodia and Kenya measure the degree of mainstreaming of adaptation
Depending on the targets	Degree of achievement of adaptation targets, for example from the NAP process or the NDC	In Brazil, the adaptation M&E system is monitoring the implementation of the targets defined by the NAP
Outcome-based	Changes in climate risk or vulnerability over time	The M&E systems of Colombia, Germany, Morocco, and United Kingdom monitor climate vulnerability or risks over time at national, sub-national, or programme level
	Avoided negative impacts from climate change	Any systems whose methods and indicators focus directly on avoided impacts
	Achievement of development goals despite climate change impacts	Proposed for the M&E systems of Cambodia, Kenya, the Philippines, and South Africa

Explanation: *Process or output-based* refers to monitoring whether implementation takes place, and whether the capacities to adapt are strengthened – without tracking whether these capacities actually led to adaptation. *Outcome-based* refers to the intended outcome of reducing vulnerability or risks, that is whether adaptation actually had an effect (Harley *et al.*, 2008).

Note: The countries mentioned are examples only. The table is not comprehensive with regard to countries providing a given type of information.

Source: Author.

instead focus on implementation of adaptation and its results, that is whether vulnerabilities are being reduced. This kind of knowledge is needed to overcome some of the challenges addressed in Chapter 3, foster learning, and inform future adaptation practice.

Due to their country-specific nature, national adaptation M&E systems measure different aspects of adaptation, and their results are therefore generally not directly comparable and do not lend themselves to globally standardized indicators. In countries with federal governments, the national adaptation M&E systems may be limited to actions under the responsibility of the national government and leave out sub-national activities. In addition, adaptation by non-state actors is often not covered. Most national adaptation M&E systems operated today are implemented by government agencies and are not independently verified – the independent Committee

on Climate Change of the United Kingdom being an exception. Finally, due to the difficulties of assessing adaptation outcomes, many national adaptation M&E systems still predominantly focus on process or output-based information. While such information is important to understand advancements in mainstreaming, it is not sufficient to measure progress towards the global goal on adaptation (Leiter and Olivier, 2017). Overall, national adaptation M&E systems have some inherent limitations for a collective assessment of progress, in particular their different scope and content, and diversity in methods and data sources, but they provide in-depth sources of information to inform and complement the assessment of adaptation progress at global levels, including the global goal on adaptation. By implementing some of the recommendations that can be taken from Chapters 5 and 6, national adaptation M&E systems could become even more useful in that regard.

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CHAPTER 5

TOWARDS THE ASSESSMENT OF ADAPTATION PROGRESS AT THE GLOBAL LEVEL

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5.1 INTRODUCTION

The Paris Agreement clearly eschews any one-size-fits-all approach to assessing adaptation. Yet adaptation accountability within the Paris Agreement is based on reporting, stocktaking, and shared learning between governments (Lesnikowski *et al.*, 2017; Magnan and Ribera, 2016). These accountability mechanisms assume some level of consistency because sharing of good practices and lessons learned are unlikely, or at least difficult, without some indicators that can be aggregated and synthesized across countries. Stocktaking similarly implies some standardization of reporting on progress to facilitate organization and synthesis of diverse country reports (Ford and Berrang-Ford, 2016; Dupuis and Biesbroek, 2013). Countries seek guidance

and frameworks on how to track and report on adaptation in ways that are recognized as rigorous, transparent, and valid, without disregarding the uniqueness of their circumstances (Silvestrini *et al.*, 2015; Wang *et al.*, *Forthcoming*). How then can we draw on a diversity of country-level assessment frameworks and reporting formats to identify indicators or metrics that can be aggregated to facilitate global assessment of adaptation? Compounding to this is the confusion over the extent to which reporting should or can be comparable and standardized across countries. Untangling this confusion and providing guidance on country-level indicators of adaptation progress that can be synthesized or aggregated is the focus of this chapter.

5.2 CRITERIA FOR A GLOBAL ASSESSMENT OF ADAPTATION

The provisions under the Paris Agreement underpin the assessment of progress made towards the global goal on adaptation. Responding to these provisions, Box 5.1 outlines 6 key criteria for country-level, globally comparable indicators of adaptation progress. Global tracking and synthesis are most likely to be achieved through two mechanisms. The first mechanism draws upon country-level assessments of adaptation progress submitted to the UNFCCC. The second mechanism employs publically available, existing, or newly yet externally collected aggregate data that are gathered at the national level and globally comparable. The key difference in these data sources is that the former are nationally-reported, while the latter are assembled or collected external to national adaptation reporting processes. While several of the criteria in Box 5.1 are shared with country-level monitoring and evaluation (M&E), the criterion of aggregation (across countries) is specific to global assessment and underpins the unique goals of the global stocktake.

Fundamental to the goal of global synthesis is that assessment approaches or indicators must be **aggregable**. Consistent with the principles of the 4Cs of systematic adaptation tracking (comparable, consistent, comprehensive, coherent), this implies that measures must be — quantitatively or qualitatively — consistent and comparable, as well as available or feasible for a comprehensive number of countries (Ford and Berrang-Ford, 2016). The requirement under the Paris Agreement to aggregate adaptation progress globally presents one of the greatest challenges to global syntheses of nationally-reported adaptation information, because country-led methodologies, indicators, and frameworks may differ

widely and even minimal standardization of reporting may be difficult to implement or verify (Lesnikowski *et al.*, 2015; Magnan *et al.*, 2015; Ford *et al.*, 2013). Aggregability is assessed in this chapter as the extent to which frameworks use indicators that are comparable, consistent, and comprehensive, with the potential for the country-level indicators to be aggregated globally.

Related to aggregation, and articulated explicitly in Article 13 of the Paris Agreement, is the need for **transparency** within the framework used to conduct the global stocktake. While transparency does not necessarily require that individual countries use comparable frameworks, it does imply the need for some degree of consistency. The transparency of adaptation frameworks is assessed here based on the extent to which methods, underlying assumptions, guiding theories, and choice of indicators are articulated.

Assessment of progress towards the global goal on adaptation requires that global synthesis or tracking be, in some way, **longitudinal**, that is, considers change over time or from some baseline. This criterion can face trade-offs with aggregability and feasibility, where frameworks that are both aggregable and feasible for a one-time assessment may not be so over time as methods, priorities, or resources change. At the same time, a focus on progress means not just an interest in a country's current activities on adaptation, but the extent to which those actions reflect progress from some previous date (Lesnikowski *et al.*, 2015; Preston *et al.*, 2009). A country may be less active in adaptation policy compared to another, for example, and yet it may have achieved greater progress from a lower baseline.

Box 5.1

Criteria	Description	Associated articles in the Paris Agreement
1. Aggregable	Does the measure reflect a consistent definition of adaptation that is comparable at the national level, and is available for a comprehensive number of countries globally such that data could be systematically aggregated (qualitatively or quantitatively)?	Article 14 focus on collective progress and Article 7 inclusion of overall progress To some extent Article 7's consideration of adaptation recognition
2. Transparent	Are definitions, assumptions, and methods transparent and consistent between countries?	Article 13 requirement for a transparency framework to inform the global stocktake
3. Longitudinal	Can the measure be tracked over time to monitor and evaluate progress?	Article 7 and 14's focus on progress implies tracking over time
4. Feasible	For global synthesis/aggregation of national assessments submitted to UNFCCC: Does the measure avoid placing undue additional reporting burden on countries? For global tracking of adaptation using publically available data: Is the measure reasonably available or can it be collected for all countries?	Implicit
5. Coherent	Does the measure reflect a concept or construct that is coherent with a general understanding of what constitutes meaningful adaptation? Are assumptions underpinning the use of proxies empirically validated or theoretically sound?	Implicit in the Paris Agreement, particularly Articles 7, 13, and 14
6. Sensitive to national context	Is the measure sensitive to diverse national contexts (for example, different political, economic, and socio-cultural priorities and resources)? Does the measure avoid unjustified, poorly evidenced, or generalized assumptions — implicit or explicit — regarding what is 'good', 'appropriate', or 'sufficient' adaptation?	Implicit but unspecified; degree of desired normativity unresolved

Feasibility will take different forms depending on whether a framework draws on nationally-submitted adaptation information or uses publically-available or externally-collected global datasets. In the case of national reporting on adaptation, feasibility means keeping reporting burdens on countries to a minimum. This is particularly relevant for developing countries, where reporting resources may be least available. In the case of publically available global datasets or external (e.g. third-party) data collection, feasibility means that indicators must either be existing and available, or there must be a reasonable expectation that data can be collected for a comprehensive majority of countries.

There is no conceptual or methodological way to measure adaptation directly (Berrang-Ford *et al.*, 2011; Biesbroek *et al.*, 2010). Adaptation M&E thus relies on proxy indicators that are **coherent** with our understanding of what constitutes meaningful adaptation, and are underpinned by empirically validated or methodologically sound assumptions (Ford *et al.*, 2013, 2015; SBSTA, 2010). Distinguishing adaptation from tokenism, identifying mainstreaming not explicitly reported as adaptation, and assessing maladaptation remain methodologically irreconcilable to-date. Coherence is assessed here based on the extent to which frameworks attempt to

select proxies of adaptation that are underpinned by theory or more directly measure adaptation-specific concepts. In practice, the desire for adaptation-specific indicators often contrasts with the need for aggregable indicators, which can be reductive and thus form crude proxies for adaptation.

The Paris Agreement clearly articulates that adaptation assessment should be **sensitive to national contexts**, reflecting the diverse range of vulnerability profiles, economic resources, and political climates across countries. There is no one-size-fits-all approach to adaptation, and no 'gold standard' for undertaking adaptation (Noble *et al.*, 2014). In line with this, there is relative consensus that, despite the goal of collective accountability, global assessment should avoid being overly prescriptive. It is unclear, however, how to methodologically balance the sensitivity to national context with accountability to assess progress towards the global goal on adaptation.

The challenge of prescribing standardized definitions or characterization of what is 'adequate' or 'effective' adaptation can be, to some extent, reconciled by a focus on national targets. *What a government is doing*, for example, is very different from asking *what a government should be doing*. Similarly, seeking to document *whether a government is meeting its goals or targets*

is very different from assessing *whether goals and targets are appropriate and/or sufficient*. A **proximity-to-target** approach enables focus on whether a government is achieving their pre-identified adaptation goals (Dupuis and Biesbroek, 2013). The use of targets or goals as benchmarks for assessment creates a conceptually feasible baseline for adaptation tracking and global synthesis across diverse countries. They may also choose to assess the extent to which relevant goals are in fact sufficiently ambitious, appropriately aligned with national vulnerabilities, and most likely to actually reduce climate vulnerability. These conceptually difficult and more normative questions, however, should be clearly distinguished from what a government is doing (descriptive), and whether a government is meeting its adaptation targets (proximity-to-targets). Given the ethos of the Paris Agreement, a global assessment is likely to be based on descriptive and proximity-to-target assessments by countries, while the sufficiency of targets is likely to be subject to normative judgement through participatory or expert review and country-led mechanisms. While the global assessments may not impose a standardized prescriptive framework to assess

whether countries are adapting sufficiently and effectively — such a framework would be conceptually impossible — it could include provisions for countries to clearly justify their own targets and provide criteria and evidence to support their chosen goals. This would be consistent with Article 13's focus on transparency, and facilitate shared learning vis-à-vis national targets and progress.

In addition to criteria discussed above, uncertainties in climate impacts and adaptation outcomes, as well as changing climate risks, are important constraints that will affect the results of assessments. The adequacy of targets, for example, may need to be revised over time as vulnerability changes, reinforcing the importance of a longitudinal assessment of progress and the need for salient, credible and legitimate science underlying the data collected for assessments. Uncertainty underlies both climate risks and also the adequacy and results of adaptation efforts. This implies that frameworks must not only be sensitive to changing vulnerability and national contexts, but also flexible given scientific uncertainty.

5.3 ASSESSING EXISTING ADAPTATION FRAMEWORKS

There are currently no agreed-upon methods, indicators, metrics, or frameworks that fulfill all of the goals listed in Box 5.1. However, a range of assessment frameworks for adaptation exist, reflecting a wide diversity of objectives, questions, data sources, and approaches to adaptation assessment that manage trade-offs between the criteria listed above differently, and according to their goals. Reflecting this, AdaptationCommunity.net provides an on-line Adaptation M&E Navigator, designed to guide selection and development of tools to respond to a range of M&E needs and priorities. While no one framework has yet met all the needs of a global assessment of adaptation progress, a breadth of frameworks can provide insights to triangulate common approaches and indicators, and identify key characteristics and components that might reasonably meet the criteria for a global assessment of adaptation progress.

This section thus systematically reviews — and synthesizes insights from — existing adaptation frameworks and tools. In doing so, we iteratively sifted through a large number of approaches and tools to select and examine those that include some level of aggregation and comparison across countries in the design of indicators. Within this selection criterion, we assess how frameworks manage trade-offs across the remaining criteria. This review thus aims to gauge the extent to which existing frameworks and their characteristics are applicable, suitable, or adaptable for assessing progress towards the global adaptation goal while minimizing the trade-offs between criteria in Box 5.1.

Several comprehensive reviews of existing assessment frameworks and tools for adaptation have already been conducted. In 2014, the Adaptation Committee of the UNFCCC initiated an inventory of ongoing M&E work of adaptation prepared under the Nairobi Work Programme on impacts, vulnerability, and adaptation to climate change (Adaptation Committee, 2016). The inventory includes 88 tools/frameworks undertaken at national or subnational levels, or by the Adaptation Committee and the Nairobi Work Programme. In the same year, UKCIP published a synthesis report of tools, frameworks and approaches for assessment of climate change adaptation and resilience. UKCIP reviewed and characterized 22 documents reporting frameworks, tools, or conceptual papers (Bours *et al.*, 2014a). The OECD systematically reviewed 106 adaptation initiatives funded by six bilateral donors in 2011 to assess and characterize adaptation M&E (Lamhauge *et al.*, 2011). In addition to these reviews, GlZ compared 10 M&E systems evaluating adaptation, with a focus on how frameworks are implemented in individual countries (Hammill *et al.*, 2013). Here we considered all adaptation frameworks and tools identified by the Adaptation Committee, UKCIP, OECD, and GlZ reviews. We additionally scanned the literature to identify any additional national-level comparative frameworks with relevance to assessing the global adaptation goal that may have been published after, or excluded by, these reviews. The key insights from this review, primarily related to aggregation and the comparative assessment of adaptation across countries, are presented below.



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5.3.1 MOST ADAPTATION ASSESSMENT FRAMEWORKS ARE NOT DESIGNED FOR AGGREGATION

A large majority of frameworks and tools available are designed explicitly and exclusively for M&E at the community, project, programme, or sector level, not the national to global level. In these cases, there is an emphasis on assessment using approaches that are designed to be tailored to each unique context. These include, for example, the UNDP's Community-based Resilience Assessment (CoBRA) framework, CARE's Participatory Monitoring, Evaluation, Reflections, and Learning (PMERL) framework, and GIZ's Adaptation Make to Measure framework. There are also a range of tools and frameworks designed for sector-specific evaluation or specific regional/national risks: for example, International Institute for Sustainable Development's (IISD's) Climate Resilience and Food Security framework, the UK's Future flooding and coastal erosion risk assessment, the World Bank's Economic Evaluation of Climate Change Adaptation Projects in the Agricultural Sector, and the Red Cross/Crescent and WHO's Tsunami Recovery Impact Assessment and Monitoring System. Given their focus and objectives, these frameworks are not designed — and have negligible potential — to be used for systematic global aggregation or synthesis of nationally-reported data.

In many cases, however, such frameworks provide rich discussion of adaptation theory and adaptation M&E, and provide insights into how adaptation can be conceptualized, measured, and tracked. CoBRA, for example, explicitly includes consideration of progress, providing an example of how longitudinal aspects of adaptation can be integrated into the assessment. Similarly, the International Climate Initiative's Ecosystem-based Adaptation M&E tool outlines a framework for assessing adaptation effectiveness using theories of change. GIZ's Making Adaptation Count report provides a guide to designing adaptation M&E to evaluate effectiveness of adaptation funding, and provides examples of M&E programmes and their specific

performance indicators. UNEP's Programme of Research on Vulnerability, Impacts, and Adaptation (PROVIA) provides extensive methodological guidance for adaptation assessment, and in doing so provides insight into a range of tools and approaches that would underpin a global framework, including consideration of participation and social justice in decision-making, outcome mapping and most significant change, logical frameworks, and options for analysis of impact, capacity, and scenarios. The Institute for Development Studies' (IDS') Learning to Adapt working paper, meanwhile, provides insight into opportunities for integrating M&E for climate change adaptation with disaster risk reduction and development goals, articulating a set of principles to facilitate M&E framework development.

Of the frameworks or tools with relevance to national-level adaptation assessments, the majority include indicators designed to aid countries in developing contextually-sensitive assessment approaches, rather than inter-country comparison or synthesis. UK-CIP's AdaptMe Toolkit, for example, outlines key questions, decisions, and stages involved in M&E development for adaptation, and outlines a logic model to articulate its components. Similarly, the OECD's National Climate Change Adaptation (Emerging Practices in M&E) provides an overview of approaches and tools for assessing adaptation progress within countries, and summarizes various national M&E programmes, but does not present a framework or comparable indicators for aggregation.

The World Resources Institute (WRI)'s National Adaptive Capacity (NAC) Framework, designed to integrate consideration of adaptive institutional capacity into national adaptation planning, provides detailed (exclusively process-based) capacity questions and 'elements to look for'. The International Organization of Supreme Audit Institutions (INTOSAI) Working Group for Environmental Auditing's report, 'Auditing the Government Response to Climate Change,' provides an example of how to methodologically reconcile the relationship between national vulnerability, government effort, and evaluation of adequacy.

5.3.2 FRAMEWORKS THAT ARE DESIGNED FOR AGGREGATION ARE OFTEN NOT SUITABLE FOR THE NATIONAL/GLOBAL LEVEL

Some frameworks integrate comparable targets and indicators for adaptation that are intended to be aggregated, but use common indicators that are poorly suited to systematic assessment at the national level. Typically, aggregation results in a sacrifice of sensitivity to context and validity of the proxies as indicators of adaptation (coherence). The Adaptation Fund's Strategic Results Framework (SRF), for example, includes a menu of standard indicators for outputs, outcomes, and impacts, which are designed to document tangible results using comparable data and aggregation across projects at the fund rather than the project level. Core aggregable indicators focus to a large extent on the presumption of measureable output data, for example targeted population groups participating in adaptation risk reduction awareness activities. The UNDP's Climate Change Adaptation M&E framework similarly includes standard output indicators to facilitate aggregation and tracking of results.

The Global Environment Fund's Adaptation Monitoring and Assessment Tool (AMAT) additionally includes common adaptation indicators designed to enable comparative

tracking over time and assess progress for the Least Development Countries Fund and the Special Climate Change Fund. AMAT indicators, similar to the SRF and UNDP frameworks, to a large extent focus on measurement of presumed proxies for adaptation outcomes. While such indicators may be plausible and arguably measureable at the project level, they are not amenable to scaling up transparently to the national level. Many of these indicators reflect counts of outputs that would be unreasonable, unreliable, or invalid if aggregated across countries with very different populations and resources.

5.3.3 FRAMEWORKS THAT ARE NATIONALLY AGGREGABLE FACE TRADE-OFFS BETWEEN SENSITIVITY/COHERENCE AND TRANSPARENCY/FEASIBILITY

Of all frameworks and tools reviewed, four included substantial consideration of aggregable indicators that can be scaled to the national level (Table 5.1). **IIED's Tracking Adaptation and Measuring Development (TAMD) project** is one of the few frameworks including explicit integration of a process for translating from the local to global levels, with articulation of scalable indicator

Table 5.1: Adaptation frameworks measureable at the national level and including aggregation aims within framework design

M&E Tool / Framework Title (Institution, date)	General Description	Suitability for assessing progress towards the adaptation goal
Tracking Adaptation and Measuring Development (TAMD) project (IIED, 2013)	A framework to evaluate how climate risks are managed, assessing development outcomes and climate resilience. www.iied.org/tracking-adaptation-measuring-development-tamd	Aggregable and scalable while retaining sensitivity to national context and adaptation-specific indicators. Open-ended questions lack reliability and transparency of methods for global assessment, and longitudinal components are limited. The key trade-off is feasibility, with significant resources needed, and only a few countries piloted. Potential to adapt framework and combine with other tools for global assessment.
Global Adaptation Index (ND-GAIN) (University of Notre Dame)	A quantitative dataset and tool to provide country-level, global, open-source, free data on vulnerability and adaptation readiness. Already globally aggregated. Indicators are generalized and not adaptation-specific. http://index.gain.org/	A fully implemented aggregable framework at the national level, providing open-source global data. Strong longitudinal focus and high feasibility. The trade-off is generic indicators that lack coherence with adaptation-specific concepts, and lack of sensitivity to national context. Could provide an example platform for data collection and mobilization if strong adaptation-focused and contextually-sensitive indicators were used.
Adaptation Scoreboard (European Environment Agency, 2013)	A framework for scoring adaptation preparedness from a policy/ institutional perspective. Designed for EU nations. https://forum.eionet.europa.eu/nrc-climate-change-adaptation/library/workshops-meetings/expert-workshop-monitoring-reporting-and-evaluation-mre-climate-change/workshop-outcomes-and-findings/european-commission_adaptation-preparedness-scoreboard	Explicitly designed for country-level tracking using standard indicators. No explicit consideration of longitudinal progress, and indicators too vague or prescriptive to measure without wide variation, reporting bias, and low reliability. Potentially adaptable if a coding scheme guide were developed, prescriptive indicators were removed or clarified and justified, and indicators validated for non-EU countries.
Pilot Program for Climate Resilience (PPCR) (Climate Investment Funds)	A scoring-based framework for adaptation governance. PPCR pilot countries track progress towards climate resilient development and implementation. http://www.climateinvestmentfunds.org/sites/default/files/results-2015/ppcr/index.html	A country-level aggregable framework with explicit longitudinal framing. One of the few that balances sensitivity to national context and coherence with transparency and comparative metrics. The key trade-off is feasibility, with significant resources needed, and only a few countries piloted.

Source: Author.

categories. The framework identifies eight indicators of climate risk management and two indicator categories for development and adaptation outcomes. Though the framework articulates the need for supporting indicators using narratives, its methods for justifying scoring are not currently designed for aggregation and systematic comparison. The greatest weakness of the TAMD framework is its feasibility in its current form. To date, it has only been tested in a small number of countries with significant investment of resources and limited longitudinal assessment of progress.

The **University of Notre-Dame's Global Adaptation Index (ND-GAIN)** is a global dataset and tool explicitly designed to summarize and compare country-level climate change vulnerability and adaptation readiness. It particularly targets the private sector and the development sector as a tool to raise awareness in order to better manage risk. Change over time is explicitly built into the tool's methodological structure, with over 15 years of data and rankings based on progress as well as current scores. The index is built around vulnerability theory, and includes two key pillars: vulnerability (including exposure, sensitivity, and adaptive capacity), and readiness. The trade-off for aggregation and feasibility within the index is relatively poor proxying of adaptation. While dimensions, components, and concepts are guided by adaptation theory, the selection of indicators is primarily driven by the availability of global datasets, with many proxies not adaptation-explicit. The ND-GAIN's index is one of the few already-aggregated global datasets, but the generalized nature of its adaptation indicators is poorly suited to documenting adaptation activity and progress by national governments (Ford and King, 2015). In addition, dependence of the scoring on primarily quantitative data limits the potential for context specificity and engagement with qualitative knowledge sources. Nonetheless, the data may be adaptable to monitoring outcomes or vulnerability reduction at the global level.

The **EU Adaptation Preparedness Scoreboard** is explicitly designed for reporting at the state level, with comparison between countries within the EU. The scoreboard's selection of indicators reflects the five steps of adaptation policy

making: preparing the ground for adaptation; assessing risks and vulnerabilities to climate change; identifying and assessing adaptation options; implementing adaptation action; monitoring and evaluation of adaptation activities. It has yet to be validated for its appropriateness in lower income countries, limiting its potential for global applications to date. There is currently no explicit integration of longitudinal considerations in indicators for change or scoring of progress. Using the quantitative scoring components of the scoreboard via national self-reporting is unlikely to result in consistent or comparable adaptation tracking data due to lack of transparency in the scoring of its open-ended questions. Along the same line, many indicators are vague — e.g. “a periodic review... is planned,” or “there are processes...” — limiting the comparability of potential outputs. While potentially scaleable globally, these factors limit the Adaptation Preparedness Scoreboard's application.

The **Climate Investment Fund's Pilot Program for Climate Resilience (PPCR) Results Framework** is a scoring-based framework for tracking adaptation governance at the national level. The PPCR scorecard structures reporting around priority sectors, with the potential for reporting to be aligned with country-specific vulnerabilities and thus contextually-relevant in terms of diverse risk profiles. Assessment of longitudinal progress is also embedded in the scorecard design, with reporting and justification of changing performance on adaptation indicators or criteria. The scorecard includes some tracking of adaptation outputs, and also attempts to count numbers of people affected by adaptation projects, though the resulting values are likely to be unreliable and unlikely to reflect valid proxies of adaptation. PPCR addresses the trade-offs between prescription and context-sensitivity by providing guiding/example scoring criteria, and leaving the decisions on scoring to the jurisdiction of individual countries, which reduces comparability of results across countries. Despite this, transparency of criteria and reporting across similar indicators may allow some aggregation and systematic assessment, and certainly facilitates reflective learning. This framework, however, demands extensive financial and human resources, which is a major barrier to feasibility for scaling up globally.

5.4 EXAMPLES FROM MOZAMBIQUE AND CAMBODIA

There are no countries that have been assessed by all four of the frameworks listed in Table 5.1, primarily because the TAMD and PPCR frameworks are predominantly used in lower and middle income countries whereas the EU scoreboard has not been used outside of the EU. Two countries, Cambodia and

Mozambique, have been assessed sufficiently by both TAMD and PPCR, and ND-GAIN data are available for most countries to allow comparison of framework results for these countries across three of the four frameworks. A summary of key indicators, results, and reported progress is shown in Table 5.2.

Table 5.2: Comparison of results from the TAMD, PPCR, and ND-GAIN frameworks for Cambodia and Mozambique

	TAMD	PPCR	ND-GAIN
Cambodia	<p>Track 1: Adaptation efforts¹ (2013 baseline) Climate policy & strategy: ~30% Climate integration into planning: ~20% Coordination: ~45% Climate information: ~20% Climate integration into financing: ~25%</p> <p>Track 2: Adaptation results Baseline data established and with emerging results. Tracked using proxies for flood, storm, and drought vulnerability vis-à-vis poverty and agriculture.</p> <p>Key messages: Government Climate Change Strategic Plan recently released. As this is the first evaluation, the framework currently has only established baselines for future assessment. Track 1 baselines show that Cambodia is still some distance away from meeting all of their selected indicators/goals. Track 2 identifies vulnerable regions and drivers of vulnerability.</p> <p>Progress: Not yet available</p>	<p>Core indicator 1²: Integration of climate change into national planning: 3.6/10 (2014), 4/10 (2015), 4.0/10 (2016).</p> <p>Core indicator 2²: Strengthened government capacity 1.75/10 (2014), 3/10 (2015), 4.25/10 (2016); coordination to mainstream 1.9/10 (2014), 1.9/10 (2015), 2/10 (2016).</p> <p>Core indicators 3-5: report on instruments tested; use of instruments at household, community, business, and public sector level; and number of people supported by PPCR.</p> <p>Key messages: Indicators 1 and 2 demonstrate moderate progress in national institutional strengthening. Establishment of National Council for Sustainable Development to coordinate adaptation, strong government commitment, establishment of ministerial coordination, establishment of a financing framework. National plans and 14 sectoral plans completed. Legislation for mainstreaming in 3 ministries. Mainstreaming climate change into budgetary processes has been initiated by some ministries. Despite some progress, strengthening capacity and coordination mechanisms to mainstream climate change into development planning remains a challenge. It is too early to report progress on core indicators 3-5.</p> <p>Progress: Modest but positive since previous reporting periods (2015 and 2014). Scoring available for 2014, 2014, and 2016.</p>	<p>Overall score³: 43.4/100 High vulnerability score (0.495) and low readiness score (0.362). Cambodia is the 51st most vulnerable country and the 56th least ready country.</p> <p>Key messages: Weaknesses in readiness are associated with ICT infrastructure, education, and innovation. It has both a great need for investment and innovations to improve readiness and a great urgency for action. Innovation proxied using patents/capita; education based on ratio of enrollment to eligible population for tertiary education; IT infrastructure proxied using mobile phone/fixed home/ internet subscriptions and use per 100 persons.</p> <p>Progress: Country has increased readiness since 1995 in absolute terms (from ~0.23) and relative to similar countries. Progress has been comparable with the average progress across Asia.</p>
Mozambique	<p>Track 1: Adaptation efforts⁴ Climate change mainstreaming/ integration into planning: ~35% Coordination: ~70% Budgeting and finance: ~10% Institutional knowledge/capacity: ~35% Climate information: ~60% Planning under uncertainty: ~35% Participation: 75% Awareness among stakeholders: ~70%</p> <p>Track 2: Adaptation results Only baseline data established. Tracked using 3 incidences of vulnerability: disaster risk index; climate vulnerability index; vulnerability index.</p> <p>Key messages: Finds that the institutional indicators on integration, coordination and knowledge management are all relatively weak, except a strong gender equality participation. Some evidence of climate risks informing planning decisions. Each ministry has a focal point for climate change, but there is no formal calendar for regular meetings. Technical expertise limited but growing.</p> <p>Progress: not reported</p>	<p>Core indicator 1⁵: Integration of climate change into national planning 1.6/10 (2014), 2.6/10 (2015)</p> <p>Core indicator 2⁵: Strengthened government capacity and coordination to mainstream 1.25/10 (2014), 2.5/10 (2015)</p> <p>Core indicators 3-5: report on instruments used and % implemented, and number of people using instruments and supported by PPCR.</p> <p>Key messages: Indicators 1 and 2 demonstrate moderate progress in national institutional strengthening. National Adaptation Programme of Action and National Strategy developed; Disaster Risk Reduction response approved by cabinet. Moving towards climate change integration into sectors, and climate change now Priority 5 on the National Agenda. Inter-ministerial group established. Financing/ budgeting mechanisms developing in key sectors. Technical climate expertise still limited. Despite some progress, strengthening capacity and coordination mechanisms to mainstream climate change into development planning remains a challenge. Core indicators 3-5 provide a range of estimates of numbers affected and instruments used/tested.</p> <p>Progress: Progress across all but one indicator (expertise) since previous reporting period (2014). Scoring available for 2013 baseline, 2014, and 2015.</p>	<p>Overall score⁶: 38.6/100 High vulnerability score (0.552) and low readiness score (0.324). Mozambique is the 31st most vulnerable country and the 32nd least ready country.</p> <p>Key messages: Readiness weaknesses are associated with ICT infrastructure, education, and innovation. It has both a great need for investment and innovations to improve readiness and a great urgency for action. Innovation proxied using patents/capita; education based on ratio of enrollment to eligible population for tertiary education; IT infrastructure proxied using mobile phone/fixed home/ internet subscriptions and use per 100 persons.</p> <p>Progress: Country has increased readiness since 1995 in absolute terms (from ~0.24) and relative to similar countries. Progress has modestly exceeded the average progress across Africa.</p>

Source: ¹ Estimates taken from (Rai et al., 2015; Appendix 2) for the national level only, using equal weighting across indicators. ² Estimates are approximations taken from PPCR (2015a, 2016) for the national level only (sectoral assessments not shown) using an average of the mean capacity and coordination scores (assuming equal weighting of questions within each). ³ From <http://index.nd-gain.org/country/cambodia>. ⁴ Results of assessment are from a pilot of Guija County and not for all of Mozambique. Estimates are taken from Artur and Gomes (2014) using mean of responses for each indicator, where indicators are equally weighted. ⁵ Estimates are approximations taken from PPCR (2015b) for the national level only (sectoral assessments not shown) using an average of the mean capacity and coordination scores (assuming equal weighting of questions within each). ⁶ From <http://index.gain.org/country/mozambique>

Both the TAMD and PPCR frameworks include reporting on adaptation efforts and results, while the ND-GAIN index reports on proxies of adaptation. The most directly comparable components between the TAMD and PPCR frameworks are for climate efforts, particularly climate integration into national planning and national coordination of climate change. In the case of Cambodia, there is relatively limited consistency in results, with TAMD identifying integration as a greater weakness than coordination and the PPCR scoring integration higher. Scoring between TAMD and PPCR are even more divergent in the case of Cambodia: while TAMD reported relatively strong coordination (~70%), the PPCR indicates low scores (2.5/10), though this is combined with strengthening of government capacity, so it is difficult to compare directly. Neither TAMD nor PPCR provide detailed data on adaptation results, with existing reporting predominantly confined to establishment of baselines, targets, and some counting or reporting of instruments used. Results reporting by these frameworks is even less comparable than adaptation efforts, though overall narratives of progress and strengths/weaknesses are similar. While the PPCR framework is stronger on quantitative scoring and reporting on progress over multiple time periods, the TAMD framework focuses on developing a narrative for national learning through M&E.

Note that Table 5.1 also indicates potential concerns regarding reliability of results across countries, indicating inconsistency in reporting within a single framework. TAMD results imply stronger adaptation efforts in Mozambique for example, PPCR results indicate generally higher scores in Cambodia. While global assessment may not be preoccupied with ranking countries, these results indicate that national-level scoring may be inconsistent and unreliable for systematic synthesis, especially when countries construct indicators and scoring rubrics themselves, and self-report the results. ND-GAIN uses indicators that are assumed to proxy adaptation, such as patents/capita and mobile phone subscriptions and are typically those that are publically available for a large number of countries and are presumed to reflect measures coinciding with adaptation. Both the PPCR and ND-GAIN frameworks provide progress data, while TAMD has not yet implemented assessment substantially beyond the establishment of baselines. Both Cambodia and Mozambique have PPCR results over several years, reporting on progress across indicators for the country as a whole and for individual sectors. ND-GAIN has a longer longitudinal time frame, with data reported since 1995 and results compared to other countries globally or to comparable countries by income group or region.

5.5 GLOBAL ADAPTATION ASSESSMENT THROUGH THE LENS OF THE SUSTAINABLE DEVELOPMENT GOALS AND SENDAI FRAMEWORK ON DISASTER RISK REDUCTION

The Paris Agreement and global stocktake are closely aligned with adaptation-related objectives, targets, and reporting within the UN Sustainable Development Goals (SDGs) and the United Nations Office for Disaster Risk Reduction's Sendai Framework for Disaster Risk Reduction (Sendai Framework). The SDGs, while not specific to adaptation, include a number of goals related to climate change adaptation (see Table 5.3 for a selection). For instance, Goal 13 (Climate Action) includes adaptation targets related to strengthening resilience and adaptive capacity, integrating adaptation into national planning, improving institutional capacity, and adaptation financing. Consistent with other adaptation M&E approaches, Indicator 13.2.1 measures the number of countries mainstreaming adaptation or implementing integrated planning for adaptation within governance. While not climate change or adaptation focused, the majority of the other SDGs, such as Goal 11 (Sustainable Communities), Goal 2 (Zero Hunger), Goal

1 (Zero Poverty), include targets that arguably reflect proxies of climate vulnerability, adaptive capacity, and resilience. Climate adaptation is thus deeply embedded within the SDGs.

The SDGs do not use baselines, but rather benchmark progress towards articulated targets within each goal. The SDGs are explicitly designed to guide countries and facilitate aggregation, collective progress, and shared learning through transparency. In doing so, the SDG framework is closely aligned with the intentions and provisions of the Paris Agreement's stocktaking exercise. The SDGs are also explicitly designed to be tracked longitudinally and to measure progress, as well as to assess both country-level achievements and collective global progress. Given the relationship and synergies between the Paris Agreement and SDGs, there is significant potential to link adaptation stocktaking and global tracking to the overarching framework of the SDGs.

Table 5.3: Examples of Sustainable Development Goals and Sendai Framework for Disaster Risk Reduction indicators that could relate to climate change adaptation

SDG indicators that could relate to climate change adaptation		
Goal		Indicators
Climate action	13.2.1	Number of countries that have formally communicated the establishment of integrated low-carbon, climate-resilient, disaster risk reduction development strategies (e.g. a national adaptation plan process, national policies, and measures to promote transition to environmentally-friendly substances and technologies).
	13.1.1	Number of deaths, missing people, injured, relocated, or evacuated due to disasters per 100,000 people
	13.3.1	Number of countries that have integrated mitigation, adaptation, impact reduction, and early warning into primary, secondary, and tertiary curricula
Zero hunger	2.4.1	Percentage of agricultural area under sustainable agricultural practices
	2.4.2	Percentage of agricultural households using irrigation systems compared to all agricultural households
Clean water and sanitation	6.4.1	Percentage change in water use efficiency over time
	6.5.1	Degree of integrated water resources management implementation (0-100)
Sustainable cities and communities	11.b.1	Percentage of cities implementing risk reduction and resilience strategies aligned with accepted international frameworks (such as the Sendai Framework)
Life on land	15.2.1	Forest cover under sustainable forest management
Sendai Framework compound indicators that could relate to climate change adaptation (outcomes and enabling environments)		
Global target		Indicators
Disaster mortality	A-1	Number of deaths and missing persons attributed to disasters, per 100,000 population
Affected people	B-1	Number of directly affected people attributed to disasters, per 100,000 population (including population injured or ill, whose dwelling is damaged or destroyed, and whose livelihood is disrupted or destroyed)
Economic loss	C-1	Direct economic loss attributed to disasters in relation to global gross domestic product (including losses from agriculture, housing sector, productive assets, critical infrastructure, and cultural heritage damaged or destroyed)
Critical infrastructure and basic services	D-1	Damage to critical infrastructure attributed to disasters (including health and educational facilities damaged or destroyed and critical infrastructure units and facilities)
	D-5	Number of disruptions to basic services attributed to disasters (including educational, health, and other basic services)
Developing countries' support	F-1	Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-2030
Early warning systems	G-1	Number of countries that have multi-hazard early warning systems

Source: IAEA-SDG (2017), Vallejo (2017) and Kato and Ellis (2016).

The Sendai Framework is a non-binding agreement with seven global targets and four priorities for action, with the overarching goal of reducing disaster risk and losses in lives, livelihoods, and health (Table 5.3). Global targets within the framework are impacts-based and include, for example, global disaster mortality reduction, reduction of disaster economic losses, and increased availability of early warning systems and disaster risk information. The Sendai Framework includes minimum standards and meta-data for reporting, and has developed a technical report with methods for measuring each target and indicator. These include, for example, indicators within Target F (Enhance International Cooperation to Developing Countries to Complement National Actions), which measure international official development assistance for disaster risk reduction bilaterally, multilaterally, and for capacity building.

Indicators within the Sendai Framework reflect impact measures for disasters, and use many of the same concepts and goals as adaptation frameworks. The framework clearly articulates progress goals and longitudinal considerations, benchmarked to future targets and linked to the SDGs. As impact measures, the framework provides a complementary approach to the Paris Agreement, and indicators could be used alongside global assessments and tracking indicators. The targets reflect impacts rather than outputs or process, however, and lack a focus on *how* countries are undertaking adaptation, as is embedded in most adaptation frameworks. Given relative transparency of methods, a focus on aggregation, and relevance to adaptation concepts, some indicators within the Sendai Framework might feasibly cross-over with or complement global assessment indicators and aggregation.

5.6 LESSONS FROM OUTSIDE THE ADAPTATION FIELD

Many of the methodological challenges related to assessing adaptation at the global scale are shared by fields outside of adaptation (Ford et al., 2013). We thus selected and reviewed 7 frameworks with similar challenges of qualifying and quantifying highly complex development or policy arenas (Box 5.2).

The majority of non-adaptation frameworks in this review used standardized and comparable approaches to derive quantifiable indicators and indices, typically collected via existing data sources or third-party collection rather than country-level self-reporting. Such approaches offer the opportunity for aggregation at the global scale. To date, there are few similar indices for adaptation policy or governance upon which to base composite scoring. Additionally, while systematic and comparable, these frameworks typically use composite indices that limit the context-sensitivity of the framework and would not be amenable to the self-reporting and country-led structure of adaptation reporting within the Paris Agreement. Such approaches would require independent initiatives and strong normative assumptions to assemble and score countries systematically.

Our assessment of non-adaptation frameworks found limited additional insights into methods to tackle questions of attribution or innovation for avoiding crude measures of output and outcomes. However, innovation could be identified in the methods of data collection, validation, and presentation. No frameworks used only narrative and

qualitative assessment for global comparison. All frameworks used some form of composite or aggregate scoring to enable systematic comparability.

A common feature among several of the frameworks was the use of expert or peer review. Some, such as Migrant Integration Policy Index (MIPEX) and the Resource Governance Index (RGI), use peer reviewers to validate responses or scoring. For example, the RGI articulates clear questions related to governance, with example scenario answers to guide scoring (Natural Resource Governance Institute, 2017). This has potential to make the scoring transparent and amenable to external validation. Similarly, the Small and Medium Enterprise Policy Index includes parallel processes for self-assessment and independent assessment via local experts (OECD, 2014). The SGI, in turn, uses a process of double expert assessment followed by expert mediation, inter-regional calibration, and advisory board approval (Sustainable Governance Indicators, 2017). Insights from these processes provide useful opportunities for individual countries or the global adaptation community to develop peer review and cross-validation mechanisms within global assessment and adaptation reporting. Peer review or expert validation of scoring could substantially increase the comparability and consistency of an adaptation tracking approach — in particular for qualitative indicators — and thus reflects a potentially suitable opportunity to reconciling some of the trade-offs between criteria listed in Box 5.1.

Box 5.2: M&E frameworks outside of the adaptation field assessed for methodological insight relevant to global adaptation tracking

- **Climate Change Performance Index (CCPI):** Evaluates climate protection performance at the national level, primarily on mitigation
- **Climate Laws, Institutions, and Measures Index (CLIMI):** Evaluates how climate policy differs in terms of quality and pervasiveness across countries
- **Migrant Integration Index (MIPEX):** Evaluates and compares government actions to promote the integration of migrants
- **Resource Governance Index (RGI):** Measures the quality of governance in the oil, gas, and mining sectors
- **SME Policy Index:** Benchmarking tool assessing and monitoring small and medium enterprises' policy frameworks in emerging economies
- **World Governance Indicators (WGI):** Evaluates the quality of government and institutions in a country
- **Sustainable Governance Indicators (SGI):** Analyzes and compares a country's need for reform and its ability to respond to current social and political challenges

5.7 LESSONS FROM THE FRAMEWORK ANALYSIS FOR THE ASSESSMENT OF ADAPTATION AT GLOBAL LEVEL

There are currently no existing frameworks that fulfil all of the criteria for an assessment of progress towards the global goal on adaptation. There is a clear trade-off between: a) frameworks emphasizing context-specificity and assessment of proxies coherent with our understanding of meaningful adaptation at the local level; and b) those that emphasize aggregation at the expense of sensitivity to context and coherent measurement. Penetration of adaptation theory into indicator selection for global datasets or frameworks is limited but emerging, and largely constrained by the conceptual complexity of adaptation.

Frameworks with the greatest potential for aggregation and global scaling are those that are designed to be aggregable while minimizing trade-offs in terms of coherent assessment of adaptation and sensitivity to national context. This is most likely achieved using a **proximity-to-target** approach whereby countries are assessed vis-à-vis national targets, and where highly prescriptive indicators of adequacy, sufficiency, and efficacy in reducing vulnerability and impacts are not subject to standardized scoring. Such prescriptive assessment is suited to justification and evidence based on qualitative and logic model approaches, complemented by theory of change narratives and quasi-experiments. Aggregation in all forms risks losing important detail as to why some adaptation approaches are working, and in what contexts they have evolved (Leiter and Pringle, *Forthcoming*). This is important for shared learning. Therefore, to minimize the pitfalls of highly aggregated indicators, any quantitative or semi-quantitative aggregation will need to be combined with qualitative — but ideally systematic and consistent — reporting that provides important depth to the global assessment.

Defining, documenting, and justifying specific adaptation outcomes and vulnerability impacts is difficult at the local and project levels, and requires extensive qualitative data, theories of change, causal narratives, or the acceptance of substantial causal assumptions. The idea of attribution, for example, is among the most desirable and yet least conceptually and methodological feasible features of adaptation (Ford *et al.*, 2015; Dupuis and Biesbroek, 2013). While some frameworks include indicators that imply direct impact from adaptation projects to reduced vulnerability at national level (e.g. CIF's PPCR), attribution assessment is unlikely to ever be feasible as a global indicator for adaptation and will remain a significant challenge within countries. Most frameworks that aggregate outcome or impact indicators face substantial trade-offs in the coherence and validity of their adaptation measures. These often include measures such as 'number of...' adaptation activities, people protected, projects, or

stakeholders engaged, for example. Such measures are amenable to transparent and aggregable data frameworks, but poor proxies of adaptation progress and poorly adapted to global comparison across diverse national contexts. A focus on **contribution** rather than attribution is emerging as a more useful concept within adaptation literature (Bours *et al.*, 2014a, 2014b; Spearman and McGray, 2011). Methods for assessing contribution, however, are difficult to scale up and are better suited as complementary evidence to aggregated indicators rather than included within standardized indicators directly. Combined methods, including standardized scoring across descriptive or proximity-to-target indicators combined with evidence of contribution, justifying targets and employing logic models, provide the greatest promise for fulfilling our criteria.

All adaptation assessment approaches use proxies for adaptation, yet few adaptation indicators have been rigorously validated, and many frameworks have limited or no clear justification or causal methods for indicator choice. Aggregation to the global level typically requires normative assumptions based on our understanding of what processes and actions are likely to lead to adaptation. To fulfil global scalability criteria, frameworks will need to be transparent in the logic models and articulation of assumptions underlying indicator selection.

Longitudinal tracking of progress is not widely considered across adaptation assessment frameworks, with ND-GAIN and the PPCR being notable exceptions, while both the SDGs and the Sendai Framework are explicitly designed for longitudinal tracking. Although many frameworks are implicitly designed to be tracked over time, few identify indicators that specifically measure progress or change. Ranking or scoring of current adaptation actions or status without explicit assessment of country-level progress limits our ability to recognize adaptation efforts, progress across diverse national contexts and achievements from different baselines. Differentiating static assessment from national progress will be a key challenge in ensuring context-sensitivity of adaptation assessment across countries. A country, for example, may fare poorly on adaptation governance indicators but demonstrate substantial progress over time, while another country may fare moderately but show no progress. The structure of longitudinal assessment within an adaptation assessment framework is thus important.

Despite relative wariness for highly prescriptive indicators within global assessment, there are a few concepts that are enshrined within the Paris Agreement and constitute global consensus: that is to say that there are a few things we

broadly agree ‘should’ be prescribed to some extent within adaptation assessment. These include acknowledgement of **human rights obligations**, and special consideration of **vulnerable populations** and **equality** (gender, age, and socio-economic status, as well as consideration of empowerment and intergenerational perspectives). For example, the Paris Agreement emphasizes ‘gender-responsive’ adaptation that takes into consideration vulnerable groups and local/traditional knowledge (African Working Group on Gender and Climate Change, 2017a). It is possible and indeed likely that some adaptation activities will reduce overall impacts but increase inequalities. This has implications for the selection of gender-responsive (and equity-responsive) indicators of adaptation results, where crude estimates may be insufficient in detecting equity impacts. Design of gender-responsive assessment frameworks that, for instance, allow to disaggregate data by sex and highlight sex or gender differences in both qualitative and quantitative data, could contribute to identifying negative impacts and allow corrective measures to be taken (African Working Group on Gender and Climate Change, 2017b). This is also relevant for processes of peer review or participation in national assessments, where mechanisms might be put in place to ensure the consideration of gender and other equity priorities.

Third-party or external validation of nationally-reported adaptation progress, or generation of global datasets from publically available data provide an alternative to standardized national reporting. While a few of the frameworks employ these approaches, notably ND-GAIN and to some extent the SDGs, there are currently insufficient existing data for validated proxies of adaptation to compile adaptation data globally. A diversity of national reporting methods and frameworks also precludes meta-analysis and synthesis of global progress. Grappling with diverse national adaptation reports could be tackled in two ways. First, we could assemble and attempt to synthesize data from existing global datasets, such as ND-GAIN and any data generated through the SDGs and Sendai Framework reporting. This would generate a relatively feasible and comprehensive dataset, but lack convincing proxy measurement of adaptation. Second, external and third-party data collection could undertake a substantial data collection and peer-review process to compile relevant country-level data using a standardized framework and a small number of adaptation-specific indicators. Such a process could reconcile most of the criteria in Box 5.1, but would require substantial resources and be difficult to implement longitudinally.

Integration of explicitly-reported external peer-review mechanisms was largely absent from the adaptation frameworks reviewed, yet presents significant potential

to reconcile trade-offs between context-specificity and transparency. The use of an approach such as PPCR, which provides standardized scoring guidelines, but leaves final scoring to countries, would be well suited to the addition of a peer-review process of scoring criteria. Peer review could additionally be used to replace prescriptive indicators within frameworks, with external review judging the otherwise murky and problematic questions of ‘adequacy’, ‘effectiveness’, and choice of national goals. Peer-review might feasibly integrate not only external expert judgement but also facilitate peer review by stakeholders at the national level. The PPCR provides a framework for integrating stakeholder consultation into the process of defining national criteria and scoring methods. A similar process would be compatible with more methodological clarity within the TAMD framework. There is, hence, substantial potential to develop an integrated process of stakeholder consultation and scoring development, combined with peer review of country-specific choices and results. Such processes provide promising opportunities to reconcile some of the more challenging trade-offs to global aggregation, and are consistent with the Paris Agreement’s goals of shared learning.

There is considerable research needed to reconcile some of the more intractable conceptual challenges in adaptation tracking. Among the most pressing are:

- Innovation and validation of new approaches to dealing with attribution and contribution;
- Innovating methods to assess outputs and outcomes beyond crude proxies;
- Operational definitions of adaptation that more effectively differentiate tokenism and mainstreaming within government activities;
- Establishment of clear baselines or terms of reference from which to measure progress within individual countries.

There are also a number of promising opportunities to engage with computational science, including automated analysis of large volumes of text, crowd sourcing, and scraping of digitally sourced data. To date, there has been negligible engagement by the adaptation community in exploring such sources of data, or collaboration with computational experts. The promise of “big data” may not resolve many of the fundamental conceptual challenges of adaptation tracking, but may provide new insights into data collection approaches and innovations that help address feasibility constraints to synthesizing large volumes of data.



06



CHAPTER 6

CONSIDERATIONS FOR A FUTURE FRAMEWORK FOR ASSESSING ADAPTATION PROGRESS AT THE GLOBAL LEVEL

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6.1 INTRODUCTION

The aim of this chapter is to provide methodological input in support of the thinking on how to assess progress towards adaptation at global level, including the global goal on adaptation, which is enshrined in the Paris Agreement. For the periodic review of this goal, a minimum amount of systematic information that can be aggregated across countries is necessary. However, the nature and diversity of national adaptation monitoring and evaluation frameworks (see Chapter 4), and the information communicated under the UNFCCC, do not lend themselves to straightforward systematic collection or aggregation. To make progress towards the global reviews despite the challenges, it would be useful to take the considerations made below into account.

The Parties to the UNFCCC could devise a framework to inform the periodic review of the overall progress towards the global adaptation goal. Such a framework could also help the Parties identify remaining gaps to reach their national goals and targets. To date it is unclear what such a framework might look like, but the timeline for negotiations foresees that the specifics of the Paris Agreement's provisions be agreed upon by COP 24 at the end of 2018 (see Chapter 2). Recommendations to help the thinking on these matters are hence very timely.

This chapter builds on previous chapters of the report and discusses desirable characteristics of a framework for assessing progress on adaptation at global level, and potential ways forward.

6.2 REVIEWING PROGRESS TOWARDS THE GLOBAL GOAL ON ADAPTATION: KEY SOURCES OF INFORMATION

As Chapter 2 illustrated, the information available to review the overall progress made in attaining the global goal on adaptation can be understood to consist of four pillars (see Figure 2.3):

1. Progress on adaptation at national levels that is reported by Parties or publicly available, and which may be synthesized under the UNFCCC;
2. Reports of the IPCC and subsidiary bodies of the UNFCCC;
3. Reports prepared for the SDGs and the Sendai Framework for Disaster Risk Reduction with relevance for adaptation, among other international agreements;
4. Global adaptation tracking by third parties based on globally comparable data at country level.

Together these sources of information can contribute to reviewing whether, collectively, countries are going in the right direction on adaptation to climate change vis-à-vis the goal to limit temperature increase to well below 2°C above pre-industrial levels, and whether the adaptation efforts are adequate in terms of the magnitude of the adaptation challenge and effective in terms of reducing climate risk to the degree necessary.

In addition to the distinction between country-level and global-level data sources to inform progress on adaptation,

a distinction can be made between government reported progress and information provided through third parties. From Chapters 3 and 5 it can be deduced that a very comprehensive framework might generate a better understanding of the overall progress towards the global goal. But would require a significant effort to collect the necessary data and would be much more difficult to establish in terms of achieving consensus on the methodologies used. On the other hand, a looser framework would be more manageable both politically and practically, and could be implemented at lower costs and within a timeframe to contribute to the first global stocktake in 2023, but would make a quantitative aggregation of country-level information less detailed and informative.

Given the complexities of monitoring and evaluating progress on adaptation, a way forward might be to start with a basic framework and build in enough flexibility into the design to accommodate changes over time that would lead to a more integrated and comprehensive adaptation assessment framework in the future. The underlying assumption is that such a framework would be sufficiently: a) broad to absorb the entire diversity of information sources and formats provided through national and global channels without adding undue burden on Parties; b) rigorous in capturing existing data to periodically characterize progress towards the global goal in line with the requirements of the global stocktake; and c) open to addition and change to accommodate new and innovative ways of assessing progress on adaptation.

6.3 COUNTRY-LEVEL INDICATORS FOR GLOBAL ASSESSMENT

For national adaptation monitoring and evaluation frameworks to usefully feed into assessing progress on the global goal on adaptation, there need to be ways through which to capture, structure, and interpret their huge diversity in approaches, indicators, and metrics, which was presented in Chapter 4. Aspects that appear relevant to the selection of indicators for country-level reporting are outlined in the following sub-sections.

DESCRIPTIVE INDICATORS CAN BE TRACKED AND AGGREGATED MORE OBJECTIVELY OVER TIME

Whereas evaluative indicators are often influenced by perceptions, values, and expectations (Chapter 3), descriptive indicators are better suitable for country-level reporting to support assessment of adaptation at global level, because they can be tracked more objectively over time and aggregated at global levels, although their ability to meaningfully assess adaptation progress is unclear.

BASELINES AND TARGETS CAN HELP TO MEANINGFULLY AGGREGATE PROGRESS ON ADAPTATION

Indicators containing proxies of national adaptation baselines and targets or goals can help to meaningfully aggregate countries' individual progress towards the global adaptation goal. Self-reporting could ensure that these baselines and targets or goals adequately reflect national climate risk perceptions and thereby follow a proximity-to-target approach conducive to assessing progress on adaptation in a nationally determined way (Chapter 5).

INDICATORS ARE NEEDED TO SYSTEMATICALLY COLLECT ALL DIMENSIONS NEEDED FOR REPORTING

Indicators can ensure that all dimensions deemed relevant for reporting on adaptation progress are, in one way or another, covered. Such dimensions can include: a) levels of vulnerability, resilience, and adaptive capacity; b) adaptation targets or goals; c) adaptation planning processes, mainstreaming, and coordination; d) implementation of actions; e) documentation of results achieved; and f) financial, technical, and capacity-building efforts.

INDICATORS CAN BE TAGGED TO COUNTRY-LEVEL REPORTING TO INCREASE EXPLICATIVE POWER

Tagging information that is part of Parties' adaptation communications to the indicators would facilitate aggregation of countries' self-reported progress towards goals and targets. This would ensure that information provided by Parties can be interpreted in the appropriate categories and would enhance its explanatory power.

FOR COMPARISON ACROSS COUNTRIES, INDICATORS NEED TO FOLLOW CONSISTENT FORMATS

To ensure that indicators on progress are comparable across countries, they would need to follow a consistent format. This would enable periodic comparison of progress on the global goal on adaptation. Complementary context-specific information could be added through qualitative assessments that would give substance, depth, and validity to the assessments.

6.4 CONSIDERATIONS FOR DEVELOPING A GLOBAL ADAPTATION ASSESSMENT FRAMEWORK

Of the adaptation assessment frameworks analyzed in Chapter 5, few allowed aggregation at national levels. Of those that did, there were unavoidable trade-offs between the ability to provide contextually meaningful information on the one

hand and the availability of comparable data and consistency of methods on the other. Yet, a few characteristics and principles considered important for the development of such a framework can be identified, and these are summarized below.

WHERE POSSIBLE USE STANDARDIZED INDICATORS TO ASSESS PROGRESS ON ADAPTATION

The use of standardized indicators to assess adaptation progress based on proximity to nationally-determined targets and descriptive metrics to outline the types and nature of processes, activities, and results would facilitate assessing collective progress across countries. The framework could be designed so that individual countries maintain their discretion to define the degree to which they adopt these indicators. Where standardized indicators cannot be used, devising ways through which information provided at the country level can be linked to standardized indicators, can help overcome challenges for interpretation.

COMBINE ACTIVITY- AND RESULTS-BASED INDICATORS FOR A MORE HOLISTIC ASSESSMENT

Within the existing assessment frameworks there is wide use of both activity-based and results-based approaches, and specific indicators from both categories lend themselves to global assessment. Activity-based indicators can more easily be monitored at several points in time, while results-based indicators can help in assessing 'adequacy' and 'effectiveness' of adaptation interventions. A combination of both types of indicators could provide information for both reviewing progress against the global goal and on the success of activities.

CLEARLY ARTICULATE AND JUSTIFY THE ASSUMPTIONS UNDERLYING THE CHOICE OF INDICATORS

Clear and explicit articulation and justification of assumptions underlying the use of indicators or proxies of adaptation as well as of targets or goals is critical. This would make assessment frameworks: a) more transparent; b) link with causal narratives and logic models; c) facilitate learning as to the causal pathways expected to drive adaptation; and d) accessible to testing, validation, and revision.

REPEATEDLY COLLECTED DATA CAN CLARIFY LONG-TERM ADAPTATION PROGRESS

A framework that reviews collective adaptation progress will need to be able to repeat data collection over time. But it will also need to differentiate two types of information: what countries, collectively, have achieved towards the global goal, and how much progress has been made since the last reporting period. This is critical to recognizing national adaptation achievements, even for countries starting with relatively limited resources or

adaptation activity, and to ensure that global assessments are sensitive to national contexts.

EXAMPLE SCORING CRITERIA AND GUIDELINES CAN HELP MINIMIZE REPORTING VARIATION

The provision of examples of scoring criteria and guidelines for standardized indicators would allow countries to self-report progress and ensure their diverse contexts are appropriately reflected in a consistent and comparable way, while minimizing the variation across countries that would invariably result in challenges for aggregation. Development of scoring criteria could involve stakeholders at government levels, different sectors, and civil society as well as peer review (described below). This allows validation of scoring without prescribing the specific ways in which countries might choose to meet their goals, and without over-standardization of methods. At the same time, such a process is consistent with provisions within the Paris Agreement for shared learning and cooperation.

NARRATIVES CAN JUSTIFY AND CONTEXTUALIZE TARGETS RELATED TO NATIONAL BASELINES

The use of theories of change, logic models, and causal narratives as documentation mechanisms for progress on adaptation provides countries with a strong rationale for justifying and contextualizing their targets or goals related to national baselines. Such an approach also reduces the danger of using prescriptive indicators for assessing adequacy and sufficiency of specific targets, which would likely result in normative statements about what constitutes 'good' or 'appropriate' adaptation. Reporting on the logic behind adaptation efforts provides relevant background information for peer-reviewed in-depth assessments, meta-analysis, and, to some degree, systematic review.

CONTRIBUTION, RATHER THAN ATTRIBUTION, IS A USEFUL CONCEPT FOR ASSESSING ADAPTATION

A focus on contribution of national efforts to certain adaptation outcomes and climate risk impacts appears to be a more useful concept than direct attribution, which is hard to establish and unlikely to be reliable across countries. Narratives and theories of change could be used to provide complementary qualitative justification of underlying assumptions to aggregated indicators of efforts and results. Focus on contribution also avoids much of the contentions related to additionality of adaptation efforts vis-à-vis development interventions.

STAKEHOLDER ENGAGEMENT LEGITIMIZES AND VALIDATES THE ASSESSMENT FRAMEWORK DEVELOPMENT

Stakeholder engagement underscores the spirit of the Paris Agreement and is relevant across all stages of developing an assessment framework. Stakeholder

participation in selection and articulation of national adaptation targets, as well as development of coding criteria for scoring, could contribute to reconciling the trade-offs between context specificity and comparability of indicator results. Countries developing coding criteria will more easily be able to explain their choices, if there is a clear and well-documented stakeholder engagement process to justify the process.

6.5 LINKING THE GLOBAL REVIEW OF ADAPTATION PROGRESS WITH THE SUSTAINABLE DEVELOPMENT GOALS AND THE SENDAI FRAMEWORK FOR DISASTER RISK REDUCTION

The linkages between the Sustainable Development Goals, the Sendai Framework for Disaster Risk Reduction and the Paris Agreement were described in Chapters 1 and 5. While there are many complementarities, there are also differences between these three agreements that are equally relevant for the assessment of adaptation progress at global level. The SDGs and the Sendai Framework measure global progress towards achieving the goals and targets laid out in these agreements, using clearly articulated indicators (IAEG-SDGs, 2017; UNISDR, 2015;

UN, n.d.). The Paris Agreement's global goal on adaptation and other adaptation provisions intend to ensure an adequate adaptation response in the context of holding the increase in the global average temperature to well below 2 °C above pre-industrial levels and pursuing options to limit the temperature increase to 1.5 °C above pre-industrial levels, but without much guidance on what this means. A few considerations on making use of indicators defined in the SDGs and the Sendai Framework are provided below.



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Chapter 5 listed several SDG and Sendai Framework indicators related to adaptation, suggesting that an assessment of the progress on adaptation could benefit from streamlining relevant indicators into an adaptation framework at global level. While utilizing the regularly collected information would be desirable to avoid duplication of efforts, create synergies between the frameworks, and minimize costs, it would be important to ensure its relevance to the goals of assessing adaptation at national and global levels (Leiter and Olivier, 2017). Similar to the expert working groups detailing the mutual adoption of the Sendai Framework and SDG indicators (IAEG-SDGs, 2017), joint initiatives could be set up to facilitate collaboration and integration in the context of the Paris Agreement.

There is also great opportunity for coherence among the agreements at all stages of development and

implementation at national levels. Opportunities for this arise from joint collaboration on the definition of indicators, mapping how goals, targets, and indicators across the frameworks relate to each other, and promotion of joint implementation, sensitization, capacity development, branding, and marketing initiatives to strengthen national ownership and communicate strong political will (Peters *et al.*, 2016). While there are limits to integration, such an approach would not only avoid duplication and minimize costs, but would also facilitate an enhanced understanding of the differences between the multiple agreements, thereby potentially increasing political support. Yet, due to the distinct content of each agreement, monitoring adaptation progress will require going beyond the currently agreed frameworks and indicators of the SDGs and the Sendai Framework (Leiter and Olivier, 2017).

6.6 TOWARDS A FUTURE FRAMEWORK FOR ASSESSING ADAPTATION PROGRESS AT GLOBAL LEVEL

The Paris Agreement places the global goal on adaptation firmly in the context of sustainable development and the long-term goal of holding global warming to well below 2 °C compared to pre-industrial levels, and of pursuing efforts to limit warming to 1.5 °C. The UN Environment Emissions Gap Report (UNEP, 2017) clearly shows that current mitigation pledges point towards a likely temperature increase of around 3 °C in 2100. There is hence an urgent need to strengthen mitigation ambition and action to avoid locking into emissions trajectories that would make reaching the long-term temperature goal untenable (UNEP, 2017). The 2016 Adaptation Finance Gap Report found that the costs of adaptation in developing countries could range from US\$ 140 billion to US\$ 300 billion per year by 2030 (UNEP, 2016). The mitigation investments needed to limit temperature increase would, over the longer term, pale in comparison to the increasing costs of climate impacts, the brunt of which would be borne by developing countries (UNEP, 2016).

Strong mitigation action is indispensable to keep the adaptation challenge manageable. However, regular assessments of the adaptation gap, defined in the Adaptation Gap Reports as the difference between the actual level of adaptation action and the level required to achieve a societal goal, can help inform adjustments in

policies and investments over time. The global stocktake to review collective progress in achieving the global goal on adaptation will be an important milestone in this regard.

Taking into account the mitigation context, the main adaptation questions of whether, collectively, the adaptation gap is being narrowed and eventually closed, and whether the efforts made towards achieving the global goal on adaptation are, indeed, adequate and effective, will increase in importance in the coming years.

There are many sources of information outside the UNFCCC that can contribute to complementing and deepening the understanding of progress towards the global goal on adaptation. These include reports prepared by the IPCC, information on progress towards the SDGs and the Sendai Framework, and third-party assessments of both country-specific and global level data. It will be important to consider how these different and heterogeneous sources of information can give the best available insight into how we are collectively progressing towards closing the adaptation gap. This will be the ultimate litmus test in providing countries with the information they need to adjust planning and decision-making with regard to national adaptation gaps.

REFERENCES

CHAPTER 1

Ford, J. D. and Berrang-Ford, L. (2016). The 4Cs of adaptation tracking: consistency, comparability, comprehensiveness, coherency. *Mitigation and Adaptation Strategies for Global Change*, 21(6), 839–859.

Ford, J. D., Berrang-Ford, L., Biesbroek, R., Araos, M., Austin, S. E. and Lesnikowski, A. (2015). Adaptation tracking for a post-2015 climate agreement. *Nature Climate Change*, 5(11), 967–969.

Leiter, T. and Olivier, J. (2017). *Synergies in monitoring the implementation of the Paris Agreement, the SDGs and the Sendai Framework*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/policy-briefs/>

Magnan, A. K. and Ribera, T. (2016). Global adaptation after Paris Climate mitigation and adaptation cannot be uncoupled. *Science*, 352(6291), 1280–1282.

UNEP (2014). *The Adaptation Gap Report: A Preliminary Assessment Report*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from <http://www.unep.org/adaptationgapreport/2014>

UNFCCC (2017a). *Progress Tracker: Work programme resulting from the relevant requests contained in decision 1/CP.21*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from http://unfccc.int/files/paris_agreement/application/pdf/pa_progress_tracker_200617.pdf

UNFCCC (2017b). *Report of the Adaptation Committee. The 32nd meeting of the Least Developed Countries Expert Group*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2017/sb/eng/02a01.pdf>

UNFCCC (2016). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>

CHAPTER 2

ActionAid, CARE and WWF (2016). *Global Goal on Adaptation: From Concept to Practice*. Johannesburg, South Africa; Chatelaine, Switzerland and Gland, Switzerland: ActionAid International, CARE International and WWF International. Retrieved from <http://careclimatechange.org/wp-content/uploads/2016/11/Global-Goal-on-Adaptation-From-Concept-to-Practice-v2-DesktopPrint-NoCrops.pdf>

Craft, B. and Fisher, S. (2016). *Measuring effective and adequate adaptation*. London, U.K.: International Institute for Environment and Development. Retrieved from <http://pubs.iied.org/pdfs/10171IIED.pdf>

GIZ (2017). *Tool for Assessing Adaptation in the NDCs (TAAN)*. Retrieved from: <http://www.adaptationcommunity.net/nap-ndc/tool-assessing-adaptation-ndcs-taan/>

IPCC (2014). *Climate Change 2014: Impacts, Adaptation, and Vulnerability; Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge (UK): Cambridge University Press.

Kato, T. and Ellis, J. (2016). *Communicating progress in national and global adaptation to climate change*. Paris, France: Organisation for Economic Co-operation and Development. Retrieved from http://www.oecd-ilibrary.org/environment/communicating-progress-in-national-and-global-adaptation-to-climate-change_5jlww009v1hj-en

Least Developed Countries Expert Group (2015). *Monitoring and assessing progress, effectiveness and gaps under the process to formulate and implement National Adaptation Plans: The PEG M&E tool*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from http://unfccc.int/files/adaptation/application/pdf/50301_04_unfccc_monitoring_tool.pdf

Least Developed Countries Expert Group (2012). *National Adaptation Plans: Technical guidelines for the national adaptation plan process*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/7279.php

Leiter, T. and Olivier, J. (2017). *Synergies in monitoring the implementation of the Paris Agreement, the SDGs and the Sendai Framework*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH.

Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/policy-briefs/>

Leiter, T., Olivier, J., Kranefeld, R., Helms, J., and Brossmann, M. (2017). *Can climate vulnerability and risk be measured through global indices?* Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/policy-briefs/>

Leiter, T. and Pringle, P. (forthcoming). Pitfalls and potentials of measuring climate change adaptation through adaptation metrics. In L. Christiansen (Ed.), *Perspectives Series on Metrics for Climate Change Adaptation*. Copenhagen, Denmark: UNEP DTU Partnership.

Leiter, T. (2015). Linking monitoring and evaluation of adaptation to climate change across scales: Avenues and practical approaches; New Directions for Evaluation, Number 147, American Evaluation Association. In D. Bours, C. McGinn, and P. Pringle (Eds.), *Monitoring and evaluation of climate change adaptation: A review of the landscape* (pp. 117-127). Hoboken, NJ, USA: John Wiley and Sons.

Ngwadla, X. and El-Bakri, S. (2016). *The Global Goal for Adaptation under the Paris Agreement: Putting ideas into action*. London, UK: Climate and Development Knowledge Network. Retrieved from <https://cdkn.org/wp-content/uploads/2016/11/Global-adaptation-goals-paper.pdf>

Price-Kelly, H., Hammill, A., Dekens, J., Leiter, T. and Olivier, J. (2015). *Developing national adaptation monitoring and evaluation systems: A guidebook*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=268

UNFCCC (2017a). *Agenda item 6: Matters relating to the global stocktake referred to in Article 14 of the Paris Agreement*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from http://unfccc.int/files/bodies/apa/application/pdf/final_informal_noteapa1_3_18052017_1800.pdf

UNFCCC (2017b). *Report of the Adaptation Committee, The 32nd meeting of the Least Developed Countries Expert Group; Addendum: Recommendations of the Adaptation Committee and the Least Developed Countries Expert Group for addressing decision 1/CP.21*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2017/sb/eng/02a01.pdf>

UNFCCC (2017c). *Adaptation-related information included in nationally determined contributions, national adaptation plans and recent national communications. Technical paper by the Secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2017/tp/07.pdf>

UNFCCC (2017d). *Progress in the process to formulate and implement national adaptation plans. Note by the Secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2017/sbi/eng/inf12.pdf>

UNFCCC (2017e). *Synthesis of submissions on agenda item 4 of the Ad Hoc Working Group on the Paris Agreement. Non-paper by the co-facilitators*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2017/apa/eng/4infnot.pdf>

UNFCCC (2016a). *Report of the Conference of the Parties on its twenty-first session, held in Paris from 30 November to 13 December 2015*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2015/cop21/eng/10a01.pdf>

UNFCCC (2016b). *Aggregate effect of the intended nationally determined contributions: an update. Synthesis report by the secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2016/cop22/eng/02.pdf>

UNFCCC (2005). *Sixth compilation and synthesis of initial national communications from Parties not included in Annex I to the Convention. Note by the Secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/2005/sbi/eng/18.pdf>

UNFCCC (2003). *Report of the Conference of the Parties on its eighth session, held at New Delhi from 23 October to 1 November*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/cop8/07a02.pdf>

UNFCCC (2000). *UNFCCC guidelines on reporting and review*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from <http://unfccc.int/resource/docs/cop5/07.pdf>

CHAPTER 3

Adaptation Committee (2016). *Inventory of ongoing monitoring and evaluation work of adaptation prepared under the Nairobi work programme on impacts vulnerability and adaptation to climate change. Note by the secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from https://unfccc.int/files/adaptation/groups_committees/adaptation_committee/application/pdf/ac10_5b_m_and_e_.pdf

Adger, N. W., Agrawala, S., Mirza, M. M., Conde, C., O'Brien, K., Pulhin, J., Pulwarty, R., Smit, B., and Takahashi, K. (2007). Assessment of adaptation practices, options, constraints and capacity. In M. L. Parry, O. F. Canziani, J. P. Palutikof, P. J.

- Linden, and C. E. Hanson (Eds.), *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 717-743). Cambridge, UK: Cambridge University Press.
- Araos, M., Berrang-Ford, L., Ford, J. D., Austin, S. E., Biesbroek, R., and Lesnikowski, A. (2016). Climate change adaptation planning in large cities: A systematic global assessment. *Environmental Science and Policy*, 66, 375-382.
- Araos, M., Austin, S. E., Berrang-Ford, L., and Ford, J. D. (2015). Public health adaptation to climate change in large cities: A global baseline. *International Journal of Health Services*, 46(1), 53-78.
- Austin, S. E., Biesbroek, R., Berrang-Ford, L., Ford, J. D., Parker, S., and Fleury, M. D. (2016). Public Health Adaptation to Climate Change in OECD Countries. *International Journal of Environmental Research and Public Health*, 13(9), 889.
- Berrang-Ford, L., Ford, J. D., and Paterson, J. (2011). Are we adapting to climate change? *Global Environmental Change*, 21(1), 25-33.
- Bierbaum, R., Smith, J. B., Lee, A., Blair, M., Carter, L., Chapin, S. F., Fleming, P., Ruffo, S., Stults, M., McNeeley, S., Wasley, E., and Verduzco, L. (2013). A comprehensive review of climate adaptation in the United States: more than before, but less than needed. *Mitigation and Adaptation Strategies for Global Change*, 18(3), 361-406.
- Biesbroek, R. G., Swart, R. J., Carter, T. R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M. D., and Rey, D. (2010). Europe adapts to climate change: Comparing National Adaptation Strategies. *Global Environmental Change*, 30(3), 440-450.
- Brooks, N., Anderson, S., Burton, I., Fisher, S., Rai, N., and Tellam, I. (2013). *An operational framework for Tracking Adaptation and Measuring Development*. London, UK: International Institute for Environment and Development. Retrieved from <http://pubs.iied.org/pdfs/100381IIED.pdf>
- Donner, S. D., Kandlikar, M., and Webber, S. (2016). Measuring and tracking the flow of climate change adaptation aid to the developing world. *Environmental Research Letters*, 11(5), 54006.
- Dupuis, J., and Biesbroek, R. G. (2013). Comparing apples and oranges: the dependent variable problem in comparing and evaluating climate change adaptation policies. *Global environmental change: human and policy dimensions*, 23(6), 1476-1487.
- Eakin, H. C., Lemos, M. C., and Nelsom, D. R. (2014). Differentiating capacities as a means to sustainable climate change adaptation. *Global Environmental Change*, 27(1), 1-8.
- EEA (2015). *National monitoring, reporting and evaluation of climate change adaptation in Europe*. Luxembourg: Publications Office of the European Union, European Environment Agency. Retrieved from <https://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation>
- EEA (2014). *National adaptation policy processes in European countries*. Luxembourg: Publications Office of the European Union, European Environment Agency. Retrieved from <https://www.eea.europa.eu/publications/national-adaptation-policy-processes>
- Ford, J. D., and Berrang-Ford, L. (2016). The 4Cs of adaptation tracking: consistency, comparability, comprehensiveness, coherency. *Mitigation and Adaptation Strategies for Global Change*, 21(6), 839-859.
- Ford, J. D., Berrang-Ford, L., Biesbroek, R., Araos, M., Austin, S. E., and Lesnikowski, A. (2015a). Adaptation tracking for a post-2015 climate agreement. *Nature Climate Change*, 5(11), 967-969.
- Ford, J. D., Berrang-Ford, L., Bunce, A., McKay, C., Irwin, M., and Pearce, T. (2015b). The status of climate change adaptation in Africa and Asia. *Regional Environmental Change*, 15(5), 801-814.
- Ford, J. D., Berrang-Ford, L., Lesnikowski, A., Barrera, M., and Heymann, J. S. (2013). How to track adaptation to climate change: A typology of approaches for national-level application. *Ecology and Society*, 18(3).
- Gagnon-Lebrun, F., and Agrawala, S. (2007). Implementing adaptation in developed countries: an analysis of progress and trends. *Climate Policy*, 7(5), 392-408.
- Heidrich, O., Dawson, R. J., Reckien, D., and Walsh, C. L. (2013). Assessment of the climate preparedness of 30 urban areas in the UK. *Climatic Change*, 120(4), 771-784.
- Henstra, D. (2016). The tools of climate adaptation policy: analysing instruments and instrument selection. *Climate Policy*, 4(496-521), 16.
- Hupe, P., Hill, M., and Nangia, M. (2014). Studying implementation beyond deficit analysis: The top-down view reconsidered. *Public Policy and Administration*, 29(2), 145-163.
- Kumamoto, M., and Mills, A. (2012). What African countries perceive to be adaptation priorities: results from 20 countries in the Africa adaptation programme. *Climate and Development*, 4(4), 265-274.
- Leiter, T. (2015). Linking monitoring and evaluation of adaptation to climate change across scales: Avenues and practical approaches; New Directions for Evaluation, Number 147, American Evaluation Association. In D. Bours, C. McGinn, and P. Pringle (Eds.), *Monitoring and evaluation of climate change adaptation: A review of the landscape* (pp. 117-127). Hoboken, NJ, USA: John Wiley & Sons.
- Leiter, T. (2013). *Recommendations for Adaptation M&E in Practice*. Bonn and Eschborn, Germany: Deutsche Gesellschaft

für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=132

Lemos, M. C., Lo, Y.-J., Nelson, D. R., Eakin, H., and Bedran-Martinse, A. M. (2016). Linking development to climate adaptation: Leveraging generic and specific capacities to reduce vulnerability to drought in NE Brazil. *Global Environmental Change-Human and Policy Dimensions*, 39, 170–179.

Lesnikowski, A., Ford, J. D., Biesbroek, R., Berrang-Ford, L., Maillet, M., Araos, M., and Austin, S. E. (2017). What does the Paris Agreement mean for adaptation? *Climate Policy*, 17(7), 825–831.

Lesnikowski, A., Ford, J. D., Biesbroek, R., Berrang-Ford, L., and Heymann, J. S. (2015a). National-level progress on adaptation. *Nature Climate Change*, 6(3), 261–264.

Lesnikowski, A. C., Ford, J. D., Berrang-Ford, L., Barrera, M., and Heymann, J. (2015b). How are we adapting to climate change? A global assessment. *Mitigation and Adaptation Strategies for Global Change*, 20(2), 277–293.

Lesnikowski, A., Ford, J. D., Berrang-Ford, L., Paterson, J. A., Barrera, M., and Heymann, S. J. (2011). Adapting to health impacts of climate change: a study of UNFCCC Annex I parties. *Environmental Research Letters*, 6(4), 44009.

Lwasa, S. (2015). A systematic review of research on climate change adaptation policy and practice in Africa and South Asia deltas. *Regional Environmental Change*, 15(5), 815–824.

Magnan, A. K., and Ribera, T. (2016). Global adaptation after Paris Climate mitigation and adaptation cannot be uncoupled. *Science*, 352(6291), 1280–1282.

Mannke, F. (2011). Key Themes of Local Adaptation to Climate Change: Results from Mapping Community-Based Initiatives in Africa. In F. W. Leal (Ed.), *Experiences of Climate Change Adaptation in Africa. Climate Change Management* (pp. 17–32). Berlin and Heidelberg, Germany: Springer.

Mannke, F. (2010). *An overview of community-based adaptation to climate change in Africa*. Wales, UK: The Arkleton Trust. Retrieved from <http://www.arkletontrust.com/?q=franziska-mannke>

Massey, E., Biesbroek, R., Huitema, D., and Jordan, A. (2014). Climate policy innovation: The adoption and diffusion of adaptation policies across Europe. *Global Environmental Change*, 29, 434–443.

OECD (2015). *Policy Perspectives: Adapting to the Impacts of Climate Change*. Paris, France: OECD. Retrieved from <https://www.oecd.org/env/cc/Adapting-to-the-impacts-of-climate-change-2015-Policy-Perspectives-27.10.15%20WEB.pdf>

Panic, M., and Ford, J. D. (2013). A Review of National-Level Adaptation Planning with Regards to the Risks Posed by

Climate Change on Infectious Diseases in 14 OECD Nations. *International Journal of Environmental Research and Public Health*, 10(12), 7083–7109.

Reckien, D., Flacke, J., Olazabal, M., and Heidrich, O. (2015). The Influence of Drivers and Barriers on Urban Adaptation and Mitigation Plans—An Empirical Analysis of European Cities. *Plos one*, 10(8), 1–21.

Reckien, D., Flackw, J., Dawson, R. J., Heidrich, O., Olazabal, M., Foley, A., Hamann, J. J.-P., Orru, H., Salvia, M., Hurtado, S. G., Geneletti, D., and Pietrapertosa, F. (2014). Climate change response in Europe: What's the reality? Analysis of adaptation and mitigation plans from 200 urban areas in 11 countries. *Climatic Change*, 122(1-2), 331–340.

Robinson, S.-a. (2017). Climate change adaptation trends in small island developing states. *Mitigation and Adaptation Strategies for Global Change*, 22(4), 669–691.

Sherman, M., Berrang-Ford, L., Shuaib, L., James, F. D., Namanya, D. B., Llanos-Cuentas, A., Maillet, M., Harper, S., and IHACC Research Team. (2016). Drawing the line between adaptation and development: a systematic literature review of planned adaptation in developing countries. *WIREs Climate Change*, 7, 707–726.

Shi, L., Chu, E., Anguelovski, I., Aylett, A., Debats, J., Goh, K., Schenk, T., Seto, K. C., Dodman, D., Roberts, D., Roberts, T. and VanDeveer, S. D. (2016). Roadmap towards Justice in Urban Climate Adaptation Research. *Nature Climate Change*, 6(2), 131–137.

Silvestrini, S., Bellino, I., and Väh, S. (2015). *Impact Evaluation Guidebook for Climate Change Adaptation Projects*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=260

Tilleard, S., and Ford, J. D. (2016). daptation readiness and adaptive capacity of transboundary river basins. *Climatic Change*, 137(3-4), 575–591.

UNEP (2016). *The Adaptation Finance Gap Report*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from <http://www.unep.org/adaptationgapreport/2016>

CHAPTER 4

Brooks, N. and Fisher, S. (2014). *Tracking Adaptation and Measuring Development: a step-by-step guide*. London, UK: International Institute for Environment and Development. Retrieved from <http://pubs.iied.org/pdfs/10100IIED.pdf>

Climate-Eval (2015). *Good Practice Study on Principles for Indicator Development, Selection, and Use in Climate Change Adaptation Monitoring and Evaluation*. Washington DC, USA: Climate-Eval Community of Practice. Retrieved from

<https://www.climate-eval.org/study/good-practice-study-principles-indicator-development-selection-and-use-climate-change>

Committee on Climate Change (2017). *Progress in preparing for climate change - 2017 Report to Parliament*. London, UK: Committee on Climate Change. Retrieved from <https://www.theccc.org.uk/publication/2017-report-to-parliament-progress-in-preparing-for-climate-change/>

Department of Climate Change, Cambodia (2016). *Cambodia's national climate change monitoring & evaluation framework*. Phnom Penh, Cambodia: Department of Climate Change, General Secretariat, National Council for Sustainable Development.

Department of Economic Affairs, South Africa (2016). *South Africa's 1st Annual Climate Change Report*. Pretoria, South Africa: Department: Economic Affairs, Republic of South Africa. Retrieved from https://www.environment.gov.za/otherdocuments/reports/monitoring_climatechange_responses#links

Department of Environment Affairs, South Africa (2011). *National Climate Change Response White Paper*. Pretoria, South Africa: Department of Environment Affairs, Republic of South Africa. Retrieved from https://www.environment.gov.za/sites/default/files/legislations/national_climatechange_response_whitepaper.pdf

EEA (2015). *Approaches and experiences from across Europe*. Luxembourg: Publications Office of the European Union, European Environment Agency. Retrieved from <https://www.eea.europa.eu/publications/national-monitoring-reporting-and-evaluation>

GlZ (2017a). *Tool for Assessing Adaptation in the NDCs (TAAN)*. Retrieved from: <http://www.adaptationcommunity.net/nap-ndc/tool-assessing-adaptation-ndcs-taan/>

GlZ (2017b). *Factsheets of national adaptation M&E systems (Austria, Bolivia, Cambodia, Finland, France, Germany, Mexico, Mekong River Commission, Morocco, the Philippines, Pilot Programme for Climate Resilience, South Africa, UK)*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/national-level-adaptation/>

GlZ (2016). *Climate Change Policy Brief: (I)NDC adaptation components and NAP*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=356

Government of Colombia (2017). *Tercera Comunicación Nacional de Colombia*. Bogotá, Colombia: Instituto de Hidrología, Meteorología y Estudios Ambientales, Adscrito

al Ministerio de Ambiente y Desarrollo Sostenible de Colombia, Gobierno de Colombia. Retrieved from http://documentacion.ideam.gov.co/openbiblio/bvirtual/023732/RESUMEN_EJECUTIVO_TCNCC_COLOMBIA.pdf

Hammill, A. and Dekens, J. (2014). *Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/me/me-guides-manuals-reports/GlZ_2014-Comparative_analysis_of_national_adaptation_M&E.pdf

Hammill, A., Julie, D., Leiter, T., Olivier, J., Klockemann, L., Stock, E. and Gläser, A. (2014). *Repository of Adaptation Indicators: Real case examples from national Monitoring and Evaluation Systems*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=221

Harley, M., Horrocks, L., Hodgson, N., and Minnen, J. (2008). *Climate change vulnerability and adaptation indicators (ETC/ACC Technical Paper 2008/9 December 2008)*. Bilthoven, The Netherlands: The European Topic Centre on Air and Climate Change, European Environment Agency. Retrieved from http://acm.eionet.europa.eu/reports/ETCACC_TP_2008_9_CCvuln_adapt_indicators

Kato, T., and Ellis, J. (2016). *Communicating progress in national and global adaptation to climate change*. Paris, France: Organisation for Economic Co-operation and Development. Retrieved from http://www.oecd-ilibrary.org/environment/communicating-progress-in-national-and-global-adaptation-to-climate-change_5jlww009v1hj-en

Least Developed Countries Expert Group (2012). *National Adaptation Plans: Technical guidelines for the national adaptation plan process*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/7279.php

Leiter, T. and Olivier, J. (2017). *Adaptation metrics and the Paris Agreement*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/policy-briefs/>

Leiter, T., Olivier, J., Kranefeld, R., Helms, J. and Brossmann, M. (2017). *Synergies in monitoring the implementation of the Paris Agreement, the SDGs and the Sendai Framework*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GlZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/wp-content/uploads/2017/09/Measuring-vulnerability-through-global-indices-Policy-Brief-GlZ-2017.pdf>

Leiter, T. and Pringle, P. (forthcoming). Pitfalls and potentials of measuring climate change adaptation through adaptation metrics. In L. Christiansen (Ed.), *Perspectives Series on Metrics for Climate Change Adaptation*. Copenhagen, Denmark: UNEP DTU Partnership.

Leiter, T. and Olivier, J. (2016). *Country-specific Monitoring & Evaluation of adaptation provides essential information needed to fulfil the Paris Agreement*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=368

Leiter, T. (2013). *Recommendations for Adaptation M&E in Practice*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=132

Lesnikowski, A. C., Ford, J. D., Berrang-Ford, L., Barrera, M. and Heymann, J. (2015). How are we adapting to climate change? A global assessment. *Mitigation and Adaptation Strategies for Global Change*, 20(2), 277–293.

Ministerio de Ambiente y Desarrollo Sostenible de la República de Colombia (2015). *Sistema Nacional de Indicadores de Adaptación al Cambio Climático*. Bogota, Colombia: Ministerio de Ambiente y Desarrollo Sostenible de la República de Colombia. Retrieved from http://oab2.ambientebogota.gov.co/apc-aa-files/57c59a889ca266ee6533c26f970cb14a/sistema_nacional_indicadores_adaptacion_cambio_climatico_camila_rodriguez.pdf

Naswa, P., Trærup, S. L., Bouroncle, C., Medellín, C., Pablo, I., Louman, B. and Spensley, J. (2015). *Good Practice in Designing and Implementing National Monitoring Systems for Adaptation to Climate Change*. Copenhagen, Denmark: Climate Technology Centre & Network. Retrieved from http://orbit.dtu.dk/files/117917089/Good_Practice.pdf

National Climate Change Committee (2013). *Cambodia Climate Change Strategic Plan 2014-2023*. Phnom Penh: Government of Cambodia. Retrieved from <http://www.camclimate.org.kh/en/documents-and-media/library/category/127-national-strategic-plan.html>

National Planning Commission of South Africa (2011). *National Development Plan 2030*. Pretoria, South Africa: National Planning Commission of South Africa, Government of South Africa. Retrieved from <https://www.gov.za/issues/national-development-plan-2030>

OECD (2015). *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*. Paris, France: OECD Publishing. Retrieved from <http://www.oecd.org/env/cc/national-climate-change-adaptation-9789264229679-en.htm>

Price-Kelly, H., Hammill, A., Dekens, J., Leiter, T. and Olivier, J. (2015). *Developing national adaptation monitoring and evaluation systems: A guidebook*. Bonn and Eschborn,

Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/uploads/giz2015_Developing_national_adaptation_M&E_systems_-_A_guidebook.pdf

Rai, N., Brooks, N., Ponlok, T., Baroda, N. and Nash, E. (2015). *Developing a National M&E framework for climate change Tracking Adaptation and Measuring Development (TAMD) in Cambodia*. London, UK: International Institute for Environment and Development. Retrieved from <http://www.camclimate.org.kh/en/documents-and-media/library/category/140-climate-change-m-e-framework.html>

Republic of Moldova (2014). *Republic of Moldova's Climate Change Adaptation Strategy by 2020 and of the Action Plan for its implementation*. Chisinau, Moldova: Climate Change Office, Republic of Moldova. Retrieved from <http://www.clima.md/doc.php?l=en&id=3741&idc=237>

CHAPTER 5

Adaptation Committee (2016). *Inventory of ongoing monitoring and evaluation work of adaptation prepared under the Nairobi work programme on impacts vulnerability and adaptation to climate change. Note by the secretariat*. Bonn, Germany: United Nations Framework Convention on Climate Change. Retrieved from https://unfccc.int/files/adaptation/groups_committees/adaptation_committee/application/pdf/ac10_5b_m_and_e_.pdf

African Working Group on Gender and Climate Change (2017a). *Gender analysis of the Paris Agreement and implications for Africa*. Ottawa, Canada: International Development Research Centre. Retrieved from <https://idl-bnc-idrc.dspacedirect.org/handle/10625/56476>

African Working Group on Gender and Climate Change (2017b). *Gender-responsive Framework for Implementing the Paris Agreement in Africa*. Ottawa, Canada: International Development Research Centre. Retrieved from <https://idl-bnc-idrc.dspacedirect.org/handle/10625/56477>

Artur, L., and Gomes, M. (2014). *Tracking Adaptation and Measuring Development (TAMD) in Mozambique: Q4 Report - Feasibility Testing Phase*. London, UK: International Institute for Environment and Development. Retrieved from <http://pubs.iied.org/pdfs/10090IIED.pdf>

Berrang-Ford, L., Ford, J. D., and Paterson, J. (2011). Are we adapting to climate change? *Global Environmental Change*, 21(1), 25–33.

Biesbroek, R. G., Swart, R. J., Carter, T. R., Cowan, C., Henrichs, T., Mela, H., Morecroft, M. D., and Rey, D. (2010). Europe adapts to climate change: Comparing National Adaptation Strategies. *Global Environmental Change*, 30(3), 440–450.

- Bours, D., McGinn, C., and Pringle, P. (2014a). *Monitoring & evaluation for climate change adaptation and resilience: A synthesis of tools, frameworks and approaches* (2nd ed.). Phnom Penh, Cambodia and Oxford, UK: SEA Change CoP and United Kingdom Climate Impacts Programme. Retrieved from <http://www.ukcip.org.uk/wp-content/PDFs/SEA-Change-UKCIP-MandE-review-2nd-edition.pdf>
- Bours, D., McGinn, C., and Pringle, P. (2014b). *Guidance note 1: Twelve reasons why climate change adaptation M&E is challenging*. Phnom Penh, Cambodia and Oxford, UK: SEA Change CoP and United Kingdom Climate Impacts Programme. Retrieved from <http://www.ukcip.org.uk/wp-content/PDFs/MandE-Guidance-Note1.pdf>
- Dupuis, J., and Biesbroek, R. G. (2013). Comparing apples and oranges: the dependent variable problem in comparing and evaluating climate change adaptation policies. *Global environmental change: human and policy dimensions*, 23(6), 1476-1487.
- Ford, J. D., and Berrang-Ford, L. (2016). The 4Cs of adaptation tracking: consistency, comparability, comprehensiveness, coherency. *Mitigation and Adaptation Strategies for Global Change*, 21(6), 839-859.
- Ford, J. D., and King, D. (2015). A framework for examining adaptation readiness. *Mitigation and Adaptation Strategies for Global Change*, 20(4), 505-526.
- Ford, J. D., Berrang-Ford, L., Biesbroek, R., Araos, M., Austin, S. E., and Lesnikowski, A. (2015). Adaptation tracking for a post-2015 climate agreement. *Nature Climate Change*, 5(11), 967-969.
- Ford, J. D., Berrang-Ford, L., Lesnikowski, A., Barrera, M., and Heymann, J. S. (2013). How to track adaptation to climate change: A typology of approaches for national-level application. *Ecology and Society*, 18(3).
- Hammill, A., Dekens, J., and Schröder-Breitschuh, S. (2013). *Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems*. Bonn and Eschborn, Germany: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from https://www.climate-eval.org/sites/default/files/blogs/GIZ_2013-M%2BE_of_Adaptation_Comparative_analysis.pdf
- IAEG-SDGs (2017). *Revised list of global Sustainable Development Goal indicators*. New York, USA: Inter-Agency and Expert Group on SDG Indicators, United Nations Statistics Division. Retrieved from <https://unstats.un.org/sdgs/indicators/indicators-list/>
- Kato, T., and Ellis, J. (2016). *Communicating progress in national and global adaptation to climate change*. Paris, France: Organisation for Economic Co-operation and Development. Retrieved from http://www.oecd-ilibrary.org/environment/communicating-progress-in-national-and-global-adaptation-to-climate-change_5j1ww009v1hj-en
- Lamhauge, N., Lanzi, E., and Agrawala, S. (2011). Monitoring and Evaluation for Adaptation: Lessons from Development Co-operation Agencies. *Environment*, (38), 51.
- Leiter, T., and Pringle, P. (forthcoming). Pitfalls and potentials of measuring climate change adaptation through adaptation metrics. In L. Christiansen (Ed.), *Perspectives Series on Metrics for Climate Change Adaptation*. Copenhagen, Denmark: UNEP DTU Partnership.
- Lesnikowski, A., Ford, J. D., Biesbroek, R., Berrang-Ford, L., Maillet, M., Araos, M., and Austin, S. E. (2017). What does the Paris Agreement mean for adaptation? *Climate Policy*, 17(7), 825-831.
- Lesnikowski, A., Ford, J. D., Biesbroek, R., Berrang-Ford, L., and Heymann, J. S. (2015). National-level progress on adaptation. *Nature Climate Change*, 6(3), 261-264.
- Magnan, A. K., and Ribera, T. (2016). Global adaptation after Paris Climate mitigation and adaptation cannot be uncoupled. *Science*, 352(6291), 1280-1282.
- Magnan, A., Ribera, T., and Treyer, S. (2015). *National adaptation is also a global concern*. Paris, France: IDDRI. Retrieved from http://www.iddri.org/Publications/Collections/Idees-pour-le-debat/WP0415_AM%20TR%20ST_adaptation%20global%20concern.pdf
- Natural Resource Governance Institute (2017). *2017 Resource Governance Index*. Retrieved October 15, 2017, from Natural Resource Governance Institute: <https://resourcegovernance.org/analysis-tools/publications/2017-resource-governance-index>
- Noble, I., Huq, S., Anokhin, Y. A., Carmin, J., Goudou, D., Lansigan, F. P., Osman-Elasha, B., and Villamizar, A. (2014). Adaptation needs and options. In C. B. Field, V. R. Barros, D. J. Dokken, K. J. Mach, M. D. Mastrandrea, T. E. Bilir, Chatterjee, M., Ebi, K. L., Estrada, Y. O., Genova, R. C., Grima, B., Kissel, E. S., Levy, A. N., MacCracken, S., Mastrandrea, P. R., and L. L. White (Eds.), *Climate Change 2014: Impacts, Adaptation, and Vulnerability Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (pp. 833-868). Cambridge, United Kingdom and New York, USA: Cambridge University Press.
- OECD (2014). *Concept Note: Revision of the SME Policy Index Methodology*. Paris, France: OECD. Retrieved from https://www.oecd.org/globalrelations/SME_Policy_Index_Methodology_Concept_Note.pdf

PPCR (2016). *Cambodia: PPCR Monitoring and Reporting*. Pilot Program for Climate Resilience. Retrieved from https://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/cambodia-ppcr_mr_report_2016_.pdf

PPCR (2015a). *Cambodia 2015 PPCR Results Report*. Pilot Program for Climate Resilience. Retrieved from https://www.climateinvestmentfunds.org/sites/default/files/meeting-documents/cambodia-2015-ppcr_results_report.xlsx

PPCR (2015b). *Mozambique 2015 PPCR Results Report*. Pilot Program for Climate Resilience. Retrieved from <https://www.climateinvestmentfunds.org/documents/mozambique-2015-ppcr-results-report>

Preston, B. L., Westaway, R., Dessai, S., and Smith, T. F. (2009). Are We Adapting to Climate Change? Research and Methods for Evaluating Progress. *Greenhouse 2009: Abstracts*.

Rai, N., Brooks, N., Ponlok, T., Baroda, N., and Nash, E. (2015). *Developing a National M&E framework for climate change Tracking Adaptation and Measuring Development (TAMD) in Cambodia*. London, UK: International Institute for Environment and Development. Retrieved from <http://www.camclimate.org.kh/en/documents-and-media/library/category/140-climate-change-m-e-framework.html>

SBSTA (2010). *Synthesis report on efforts undertaken to monitor and evaluate the implementation of adaptation projects, policies and programmes and the costs and effectiveness of completed projects, policies and programmes, and views on lessons learned, good practices.* Bonn, Germany: Subsidiary Body for Scientific and Technological Advice, United Nations Framework Convention on Climate Change.

Silvestrini, S., Bellino, I., and V  th, S. (2015). *Impact Evaluation Guidebook for Climate Change Adaptation Projects*. Bonn and Eschborn, Germany: Deutsche Gesellschaft f  r Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from http://www.adaptationcommunity.net/?wpfb_dl=260

Spearman, M., and McGray, H. (2011). *Making Adaptation Count: Concepts and Options for Monitoring and Evaluation of Climate Change Adaptation*. Eschborn: Deutsche Gesellschaft f  r Internationale Zusammenarbeit (GIZ). Retrieved January 8, 2015, from http://pdf.wri.org/making_adaptation_count.pdf

Sustainable Governance Indicators (2017, October 15). *Methodology*. Retrieved from Sustainable Governance Indicators: <http://www.sgi-network.org/2017/Methodology>

Vallejo, L. (2017). *Insights from national adaptation monitoring and evaluation systems*. Paris, France: OECD. Retrieved from <http://www.oecd.org/environment/cc/Insights%20from%20national%20adaptation%20monitoring%20and%20evaluation%20systems.pdf>

Wang, F. M., Ford, J. D., Lesnikowski, A., Chen, C., Berrang-Ford, L., and Biesbroek, R. (forthcoming). Assessing Stakeholder Needs for Adaptation Tracking. In L. Christiansen (Ed.), *Perspectives Series on Metrics for Climate Change Adaptation*. Copenhagen, Denmark: UNEP DTU Partnership.

CHAPTER 6

IAEG-SDGs (2017). *Revised list of global Sustainable Development Goal indicators*. New York, USA: Inter-Agency and Expert Group on SDG Indicators, United Nations Statistics Division. Retrieved from <https://unstats.un.org/sdgs/indicators/indicators-list/>

Leiter, T., and Olivier, J. (2017). *Synergies in monitoring the implementation of the Paris Agreement, the SDGs and the Sendai Framework*. Bonn and Eschborn, Germany: Deutsche Gesellschaft f  r Internationale Zusammenarbeit (GIZ) GmbH. Retrieved from <http://www.adaptationcommunity.net/monitoring-evaluation/policy-briefs/>

Peters, K., Langston, L., Tanner, T., and Bahadur, A. (2016). *'Resilience' across the post-2015 frameworks: towards coherence?* London, UK: Overseas Development Institute. Retrieved from <https://www.odi.org/sites/odi.org.uk/files/resource-documents/11085.pdf>

UN (n.d.). *Sustainable Development Goals*. Retrieved October 15, 2017, from United Nations: <http://www.un.org/sustainabledevelopment/sustainable-development-goals/#>

UNEP (2017). *The Emissions Gap Report 2017. A UN Environment Synthesis Report*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/22070/EGR_2017.pdf?sequence=1&isAllowed=y

UNEP (2016). *The Adaptation Finance Gap Report*. Nairobi, Kenya: United Nations Environment Programme. Retrieved from <http://www.unep.org/adaptationgapreport/2016>

UNISDR (2015). *Sendai Framework for Disaster Risk Reduction 2015-2030*. Geneva, Switzerland: United Nations Office for Disaster Risk Reduction. Retrieved from <http://www.unisdr.org/we/coordinate/sendai-framework>



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